SEPTEMBER 1955

# WOOD WORKING Digest

A HITCHCOCK PUBLICATION

BERTHELSEN...

# PACE-SETTER

*. . . in precision press engineering*

***BERTHELSEN ENGINEERS*** have developed a 2" chambered hot platen for use with any heating medium . . . ***a revolutionary concept in hot plate press design.*** No other platen construction can offer greater controlled uniform temperatures over the entire pressing area in any temperature range.

This is just one of many reasons why ***BERTHELSEN*** sets the pace in press engineering today.

Investigate how **BERTHELSEN** can engineer presses to do specific special jobs utilizing Berthelsen *"know-how"* and modern production techniques to your advantage and profit. Write today for further information.

**BERTHELSEN PRESSES**

P.O. Box 1423
Lockport Road
Joliet, Illinois

# Choose the "Oliver" Jig Saw that meets your needs BEST!

**Interior and exterior scroll work are easily cut on heavy duty "Oliver" Jig Saws. Cut wood at high speed. Also cut light metals. Unlimited capacity. Unmatched for easy and smooth operation.**

**"OLIVER" No. 173-S JIG SAW**

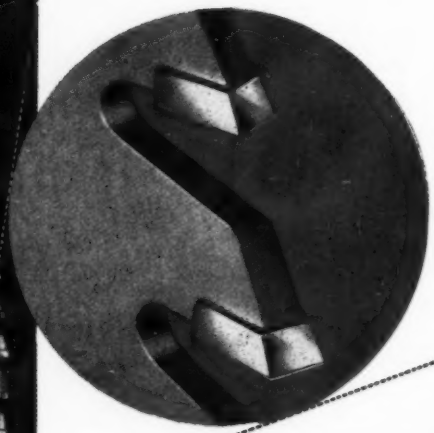
Upper tension unit of this machine (above) is mounted on ceiling to give unlimited capacity. Has table 72" or 34" square. Saw is operated by vari-speed drive at 650 to 1300 strokes a minute. Motor and brake completely controlled by a foot-lever.

**"OLIVER" No. 173-E JIG SAW**

This Saw (right) cuts delicate fretwork without tearing, or patterns up to 9" thick with accuracy. Table is 34" square, and turned 1/8th around to increase capacity. Table tilts 30° to right or left. Unique tension device insures smoothest work. Furnished with V-belt or direct motor drive. Fully controlled by foot-lever.

*. . . write for complete details*

OLIVER MACHINERY COMPANY, GRAND RAPIDS 2, MICHIGAN



# DEPENDABLE TIP

## ...that increases cutting production up to 300 times

Startling but true, Simonds Carbide-Tipped Saws stay sharp up to 300 times longer than solid type saws . . . provide tremendous savings on sharpening, downtime and replacement costs.

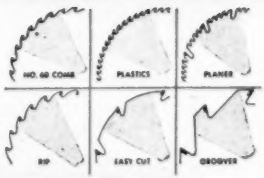
Simonds selects a special grade of Carbide that combines the best wear-resistance qualities with maximum toughness. A superior Simonds brazing technique practically eliminates any possibility of damage to the alloy steel saw plate or to supporting shoulder back of tip.

Precision sharpening gives each tooth exactly the same clearance . insures perfect alignment, perfect balance. As a result, each tooth does its full share of cutting — gives the longest, finest service you've ever experienced.

Available for cutting practically any material, any purpose . . . Simonds offers the most complete line of Carbide-Tipped Saws on the market.

*Send for free Carbide-Tipped Saw Catalog describing Simonds complete line*

A SAW FOR EVERY PURPOSE




**SIMONDS**
**SAW AND STEEL CO.**
FITCHBURG, MASS.

# CARBIDE-TIPPED SAWS

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

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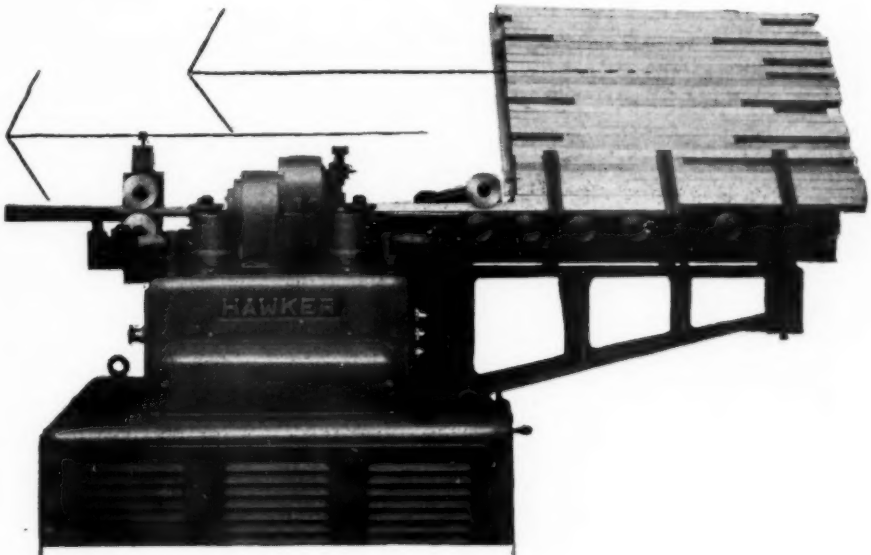



# world's fastest dowel machine

## now world's easiest!

Now—one man can easily keep the machine—the Hawker rod and dowel machine, the world's fastest—running at capacity, all day long. A number of installations are proving this every day.

The new semi-automatic feeder (operator merely fills rack with rough stock as needed) makes possible even more profitable use of this machine. And it rounds out these standard features:

Minimum of vibration and chatter, no splintering—self-centering stock guide holds stock to within ½" of cutters.

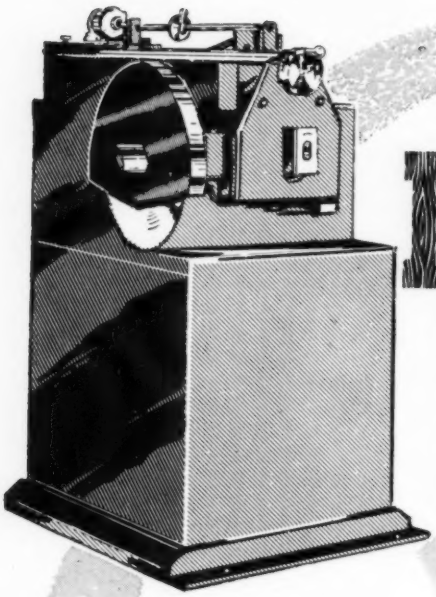
No twisting or spinning of dowel—vertically mounted secondary outfeed rolls prevent it.

Higher cutting speeds, better surface finish—variable speed stock-feed drive lets operator select speed best suited for size and stock.

Write for new Hawker manual. The Hawker Manufacturing Co., 1449 Keowee Street, Dayton 4, Ohio.

PRODUCTION MACHINES FOR WOOD. DOWEL, CHUCKING, SPECIAL

**HAWKER**



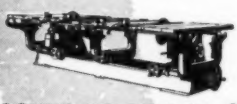
SPECIFY

# BEACH

*the only*
*all electric automatic*

## STRAIGHT LINE CUT-OFF SAW*

TILTING TABLE SAW



DOUBLE CUT-OFF SAW

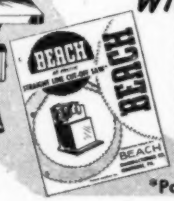
SHAPER

The safest automatic feed ever offered—all electric—no air or hydraulics used! New mounting principle assures straight line action throughout the stroke—on lightest or heaviest work.

Only Beach offers all these features in a Straight Line Cut-Off Saw*:

- **adjustable pushing power on the stroke**
- **foot pedal control for single or continuous operation**
- **selective forward feeding speeds with quick return**
- **quick adjustable stop for length of stroke**
- **hand or power operated without adjustments**
- **sealed ball bearings—no oiling or greasing**
- **built-in saw guards; enclosed ram**

Standard 5 HP motor with ½ HP feed motor. Standard machine with 20'' stroke; others to order.




***Write today—***

for full details on Beach all electric Straight Line Cut-Off Saws and the complete line of Beach woodworking machinery.

*Patent applied for

**BEACH**
**MANUFACTURING CO.**
**MONTROSE, PA.**

WOOD WORKING Digest

SEPTEMBER, 1955
Vol. 57, No. 9

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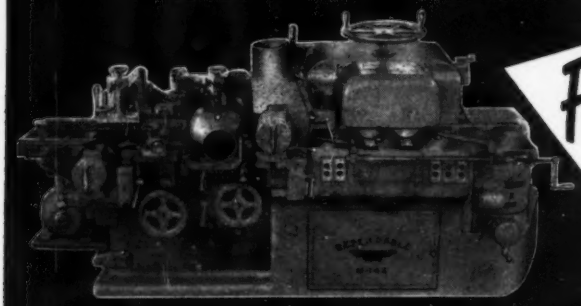
MEMBER
BPA

# MAKE PATTERN CHANGES



FASTER WITH A

# DEPENDABLE MOULDER

Don't waste time with change-over on patterns . . . cut change-over time to a minimum with a Dependable Electro-Unit Drive moulder.

Thanks to Dependable's versatile Cartridge Spindle Unit, your moulder is never "down" with cutter grinding and jointing. Complete spindle is removed with head intact. No tools are required.

Moulder production is easily pre-planned. As one pattern is being run, another pattern can be made ready for the next run. Down-time is cut in half.

With a Dependable Moulder, higher speed production is assured. Rate of feed is from 20 - 150 FPM with U. S. Varidrive. Variable high spindle speeds (up to 6,000 RPM) are obtained **without frequency changer,** giving you finer finishes with fewer knives. Higher spindle speeds save you time and money because **four knives do the work of six.**

**Call or write today for full information or ask for DEPENDABLE'S**

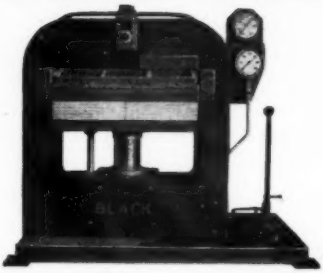
**NEW BULLETIN C-12**

Dependable DF

MACHINE COMPANY, INC.

GREENSBORO, NORTH CAROLINA, U. S. A.

# Presses

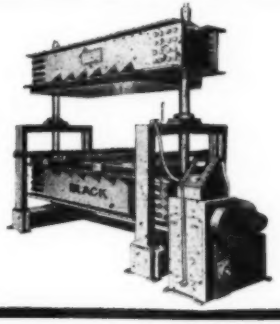


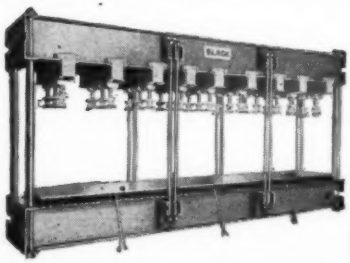
## HYDRAULIC PRESSES

Black's hydraulic laminating press is designed for laboratory and experimental work or light production operation. Standard sizes from 1 to 12 or more square feet and pressures up to 100 tons. Now available with heated platens. Variations may be had in size of platens, vertical opening, length of stroke, total pressure applied, heated platens and fast closure arrangements. Write for Bulletin 11-P.

## ELECTRIC PRESSES

Black's electric press is fast and efficient on laminating jobs which require moderate pressure, and has proved to be especially popular in the laminating of flush doors and plastic laminates. Here is a high production press at a low initial cost which will give continuous service with an irreducible minimum of maintenance and attention. Write for Bulletin 11-E.





## HAND POWERED PRESSES

Black's all steel aircraft model press is stronger and more rigid than conventional presses . . . has wide flange main beams, double corner posts and multiple strain rods. Designed for compact installation requiring no blocking or pit. Offered in a complete range of sizes for every conceivable requirement. Also ten sizes of sectional press units are available. Write for Bulletin 11-G.

***"If its gluing equipment—we have it"***

**write today . . .**

**THE BLACK BROTHERS CO., INC.** — **820 9th St., MENDOTA, ILLINOIS**

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There's a big difference between getting an order—and getting the job.

How often have you lost or had to resell the same drainboard or surfacing job two or three times over because the distributor or manufacturer couldn't deliver unless your customer waited weeks—or even months? With Lamin-Art you sell the job only once! And, Lamin-Art helps you get the order—and keep the job.

HERE'S HOW:

## LAMIN-ART PLASTIC SURFACES are—

1. *Stocked for immediate shipment* by distributor and factory in over 60 patterns and colors,
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3. *Nationally advertised and accepted* by the nation's outstanding architects, builders and decorators.

*Write today to learn how* **LAMIN-ART** *can give you More Profits.*

**MAIL COUPON TO: FABRICON PRODUCTS, Whittier, Calif.**

**Send information on the Lamin-Art Line to:**

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**IMPROPERLY-DRIED**
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*Protect YOUR profits! Rely on STANDARD DRY KILN'S* internal fan construction and automatic reversible cross-recirculation for faster, more uniform drying under exact conditions throughout every kiln load. *Rely on STANDARD to cut operating costs!* Whether you need a single unit, a full battery of kilns, or need to remodel your old natural draft installations for maximum profit-building results, get the facts . . . and you'll get STANDARD!

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## For quality production and low cost planing

**Whitney 97 Double Surfacer**
Feeds: 30 to 90 feet per minute
Planes stock ⅛" to 7" thick
Widths, 30" 36" 40" and 44"

**The Whitney 97 Double Surfacer, the last word in modern planer design, is built to handle your double surfacing requirements. Its rugged proportions and faster feeds permit it to handle easily the volume production required in today's modern plant. Traditional Whitney accuracy and careful workmanship assure smooth, accurate planing, continuous production, low cost maintenance and the stamina to produce best results under the severest kind of service.**

**The Whitney 97 will bring to your plant a new conception of production efficiency and cost savings. High production quotas will be maintained and sanding and finishing costs substantially reduced. Investigate today the Whitney 97 for your double surfacing requirements. Write for full particulars. Ask for planer bulletin D 1.**

### *Check these features*

- **Wedge Construction**
- **Nitralloy Center Table**
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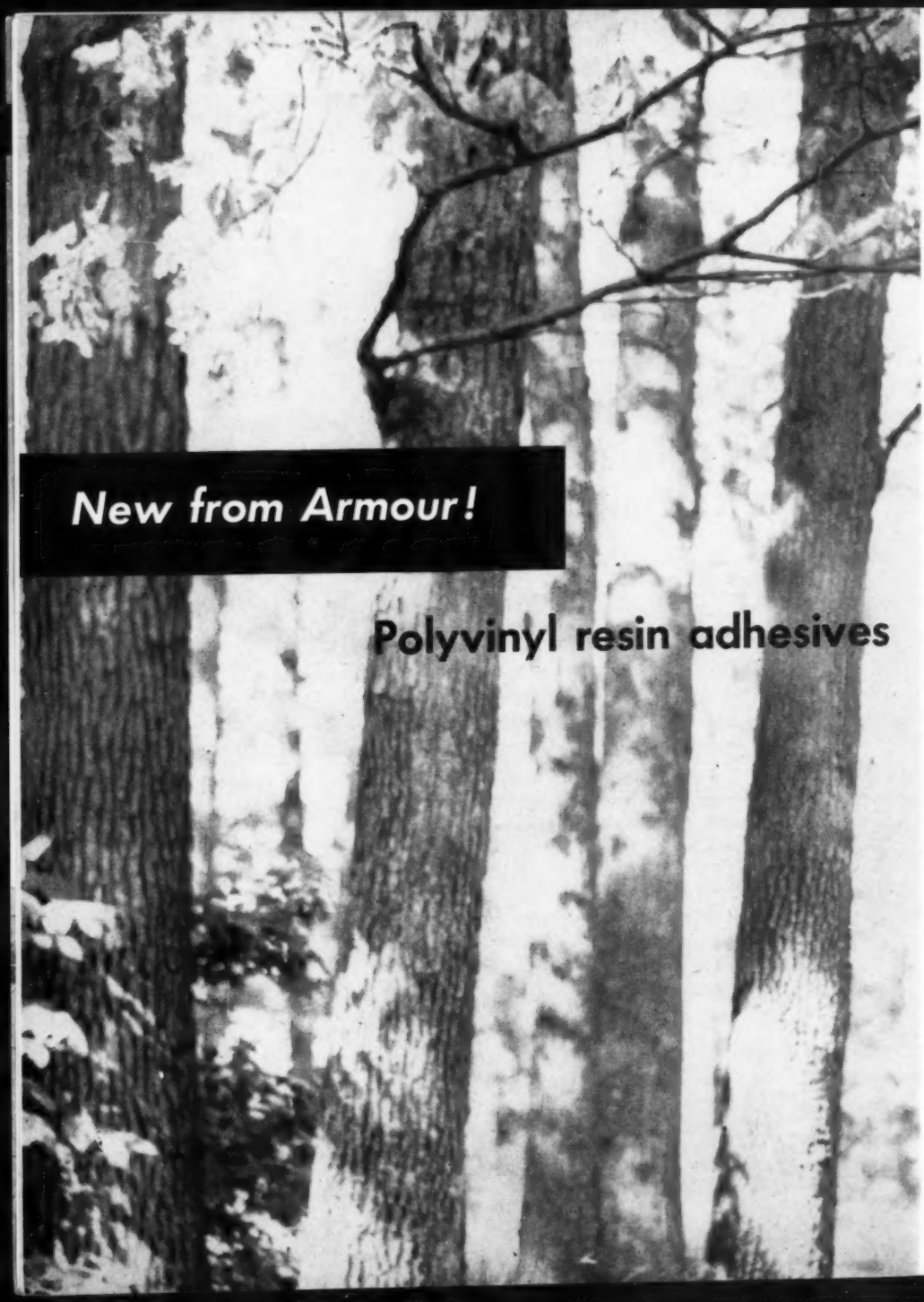
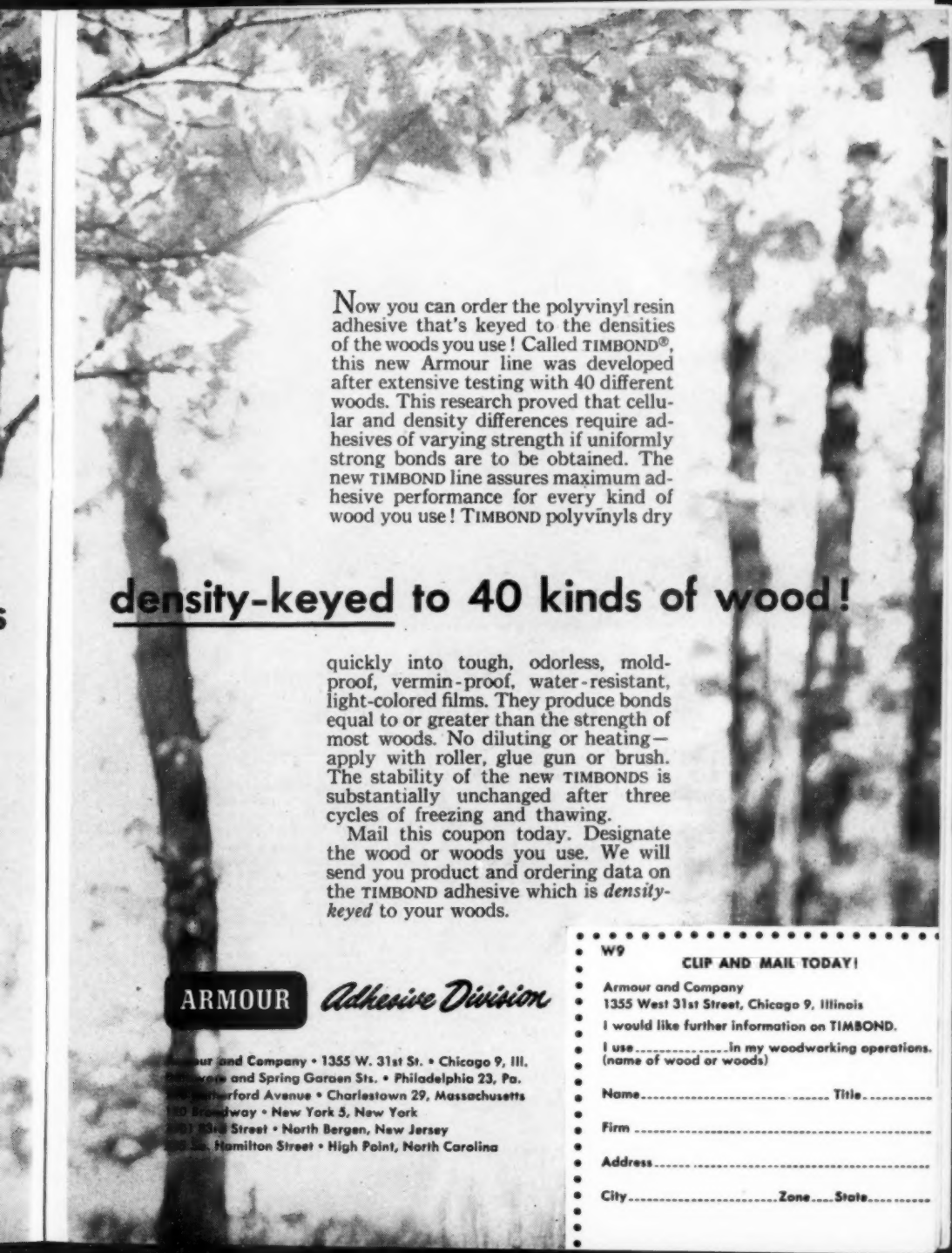

New from Armour!
Polyvinyl resin adhesives



Now you can order the polyvinyl resin adhesive that's keyed to the densities of the woods you use! Called TIMBOND®, this new Armour line was developed after extensive testing with 40 different woods. This research proved that cellular and density differences require adhesives of varying strength if uniformly strong bonds are to be obtained. The new TIMBOND line assures maximum adhesive performance for every kind of wood you use! TIMBOND polyvinyls dry

# density-keyed to 40 kinds of wood!

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W9

**CLIP AND MAIL TODAY!**

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I use _____ in my woodworking operations.
(name of wood or woods)

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Firm _____

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## Weyerhaeuser Sales Company

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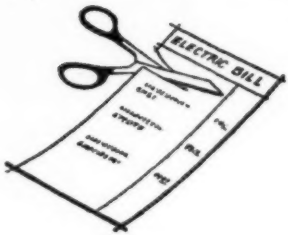


## SAVE 80% ON POWER, TOO!

The M-R 100-inch veneer edge-gluer requires only 15 kilowatts to do the job others do with 100 to 140 kilowatts. Cut your electric bill—speed production, too!

**Mann-Russell Veneer Edge-Gluer Puts Heat Into the Glue Line ONLY — Won't Dry or Scorch Veneer Surfaces!**

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another constructive
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made with

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*RCI makes a comprehensive line of adhesives, including proteins, urea-formaldehydes, phenol-formaldehydes and resorcinols.

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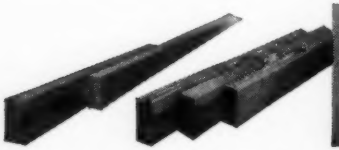

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*Walter of Wabash*
WABASH, INDIANA

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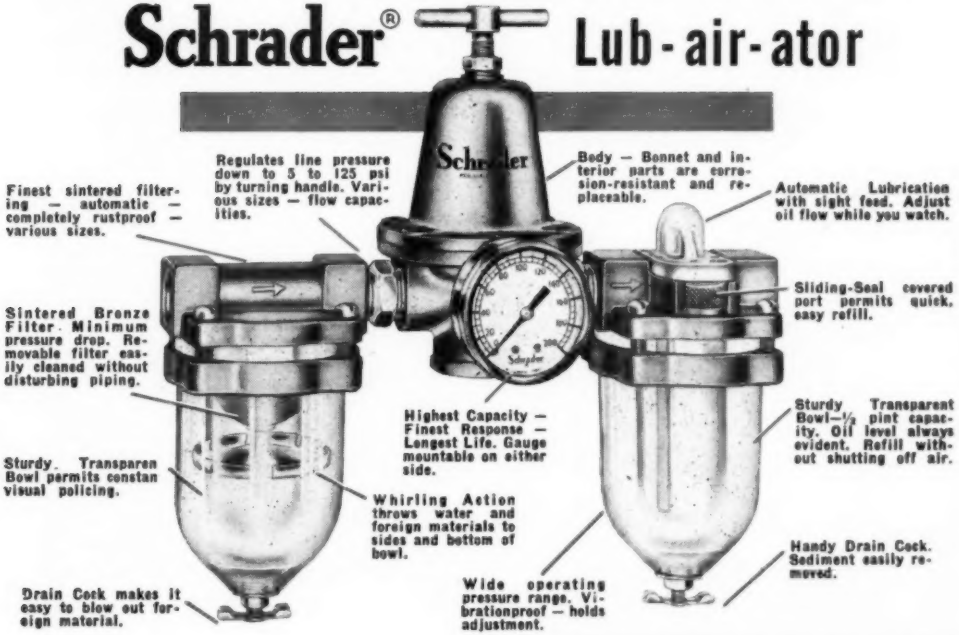
# Schrader® Lub-air-ator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## Presdwood Shows Off Its Stamina

'Round and 'round they go . . . thrilling their audience night after night, week after week. The floor they skate on has to be strong and durable. And super-smooth, without sudden splinters or cracks. For safety's sake, they use rugged Masonite Tempered Presdwood.

The stamina of this dense, all wood hardboard is well known to many manufacturers. So are its superior fabricating qualities, its freedom from knots and grain, its ability to take and hold a great variety of finishes.

Masonite® research has developed a total of 44 distinct types and thicknesses of Presdwood®. One or several of these may be just what your product designers are looking for. Why not let a trained Masonite Sales Engineer help you find out, at no obligation, of course. Write Masonite Corporation, Dept. WWD-9, Box 777, Chicago 90, Illinois.

**Choose This Man—He** **Makes The Difference**

# MASONITE CORPORATION

**MANUFACTURER OF PRESDWOOD PANEL PRODUCTS**

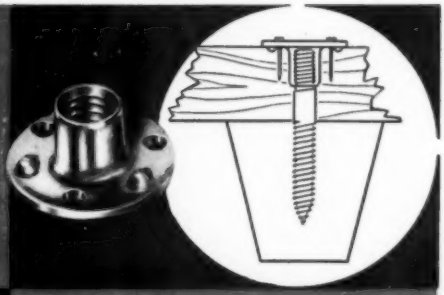
# TEENUTS

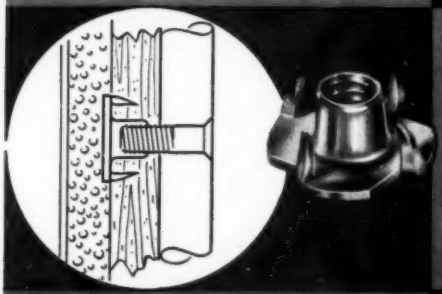
**flush fasteners for furniture and general woodworking**

Teenuts provide positive anchorage for bolts, can be used with or without counterboring and permit repeated assembly and disassembly without damage to wood. Simply drill hole size of Teenut barrel and hammer in the Teenut. Same size hole for bolt. Wide variety of thread sizes, barrel lengths, flange designs . . . can be supplied in volume quantities.

**SHORT PRONG TEENUT**

Can be held in place by brads until final attachment of components by dealer or consumer. Short prongs prevent turning when hanger bolt is tightened.



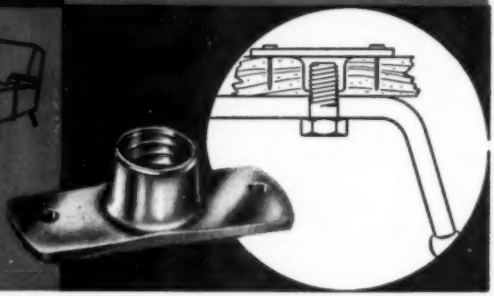


**LONG PRONG TEENUT**

Prongs are curved for twisting action as Teenut is driven, provide extra holding power in wood. Chair back or seat are easily assembled or disassembled.

**RECTANGULAR FLANGE TEENUT**

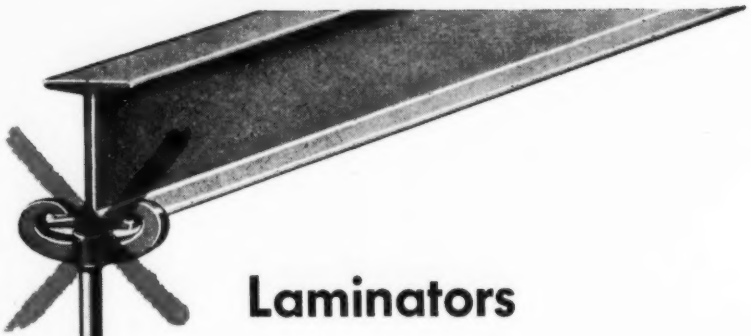
Has narrow base for use in limited spaces. Held in place by brads instead of prongs. Specially designed for heavy duty applications.



**UNITED-CARR Fastener Corp.**

31 Ames St., Cambridge 42, Mass. • *In Canada* — Gage Avs. and Beach Rd., Hamilton, Ontario

MAKERS OF DOT FASTENERS



## Laminators

# Throw these away!

### make:

- plastic covered tops
- flush doors
- cold pressed veneers
- frame-to-hardboard layups

### eliminate:

- high labor costs
- handling hazardous, unwieldy metal
- overcrowding floor space
- unequal clamping pressures

- handling hazardous, unwieldy metal
- overcrowding floor space
- unequal clamping pressures
- bent beams causing poor pressure in the center
- clamp periods running 6 hours and longer
- human errors in clamping
- expensive initial investment

# modernize!

— with National's KWIK-KLAMP PROCESS.

Details are ready. A National field engineer has all the information you need.

RESYNS®

National

ADHESIVES

**NATIONAL ADHESIVES.** Woodworking Department WD (Resin Division), 270 Madison Ave., New York 16. 3641 So. Washtenaw Ave., Chicago 32. 735 Battery St., San Francisco 11. 1511-23 So. Main St., High Point, N. C.

*OK show me!*

Send me one of your field engineers to explain the KWIK-KLAMP PROCESS.

Name_____

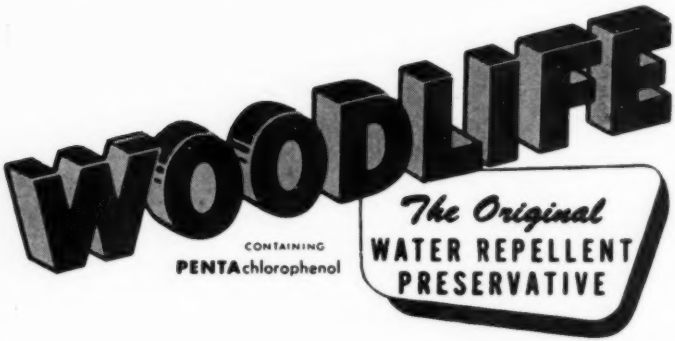
Title_____

Firm_____

Address_____

City_____ Zone____ State_____

*"The memory of quality remains long after price is forgotten"*




**HERE'S TIME-PROVED**
**"LIFE ASSURANCE" FOR YOUR PRODUCTS**

Pride in product is the common denominator of the hundreds of manufacturers who use Woodlife—and *only* Woodlife—to give their products basic protection against . . . . . *Moisture and water absorption, decay, swelling, shrinking, warping, checking, grain raising and termites.*

These manufacturers know that Woodlife quality is underwritten by over 30 years of continuing research in the most active chemical and testing laboratories in the water repellency field.

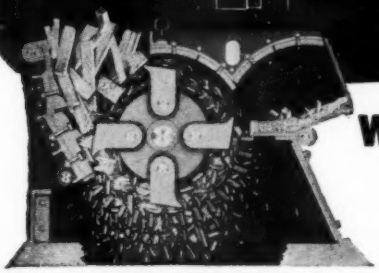
If you have pride in *your* products and don't know about Woodlife—*you should!* Protection Products engineers will be glad to work with you to develop the most economical Woodlife treatment method for your specific application. Send for the informative folder, "WOOD PRESERVATION WITH WOODLIFE".

**WRITE**

**Protection Products**
**MANUFACTURING COMPANY**
*Since 1921*
**Dept. X. Kalamazoo, Michigan**

# Get Better, Lower-Cost Fuel From Waste Wood!

Typical automatic installation in many plants. All wood scrap is conveyed to the hog, then chips are blown to fuel bin. In some installations, chips are blown to a stoker which feeds them into boiler or furnace; in other cases, chips are blown directly into fire box.



Cross section of "No-Nife" Hog showing how fast-moving chisel-edge hammer reduces wood by impact until properly sized to pass through grates in bottom of hog.

## WILLIAMS "No-Nife" HOGS

When reduced to chips in a "No-Nife" Hog, wood scrap is 100% combustible—the cheapest of any fuel for producing heat and power. Money-wasting unhogged wood refuse won't burn evenly, restricts air flow, smothers the fire, causes excessive smoke and soot.

By hogging, handling costs are also reduced up to 75%. One man can handle as much tonnage in chip form as three men can handle in long lengths, awkward and odd-shaped pieces. In most installations, labor savings alone pays for a "No-Nife" Hog in a few months.

***Write For Fact-Filled Brochure***

***Williams builds a complete line:***
Hogs, Grinders & Shredders • Vibrating Screens • Air & Mechanical Separators Heavy Duty Fans • Cyclone Collectors.

**WILLIAMS PATENT CRUSHER & PULVERIZER CO.**
**908 ST. LOUIS AVENUE** **St. Louis 6, Mo.**

# WILLIAMS

**CRUSHERS GRINDERS SHREDDERS**

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

# Quality wood parts by Morgan Manufacturing Co., Inc. BLACK MOUNTAIN, N.C.

A tight production schedule calls for sure delivery by suppliers. Here's one who knows your problems and acts accordingly.

Maybe we could work together: it's not hard to find out.

Morgan Manufacturing Co., Inc. BLACK MOUNTAIN, N.C.

## The Nation's largest producer of ready-to-assemble wood parts for furniture manufacturers

...and that goes for mahogany, also!

# THE HALLMARK

## of Quality

**Represented in the Entire Knife Line. And Introducing a New High Speed Steel Thin Knife**

## Stalter EDGE TOOL CO.

THIN HIGH SPEED STEEL

SHAPER STEEL

TUNGSTEN TEMPER

An entirely new and improved High Speed Steel Thin Knife is now being presented by the Stalter Edge Tool Company under the well known name of Tungsten Temper.
To provide a better knife Stalter has added an exclusive new NON-SLIP back. Metallurgical study has increased the edge strength. Order a set of Stalter Thin Knives and prove the advantages in your own plant.
The same new developments are incorporated in the Stalter Shaper Steel. The apex in shaper steel manufacture.

TUNGSTEN TEMPER

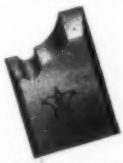
For use on modern fast moulders and stickers the Stalter Tungsten Temper (High Speed) or Thermo Temper (Carbon) provides the finest in slotted thick knives.

THERMO TEMPER

High Speed or Carbon Steel Planer Knives can be furnished to your specifications. Stalter Planer Knives can be supplied solid or inlaid. Write our engineering department for their recommendations.

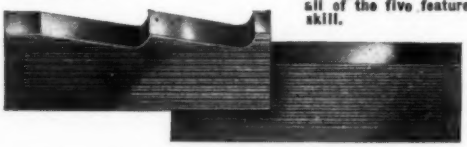
Tenon Knives furnished in High Speed or Carbon Steel, when made by Stalter, are the tops in durability, balance, and stamina.

Accurate interpretation of your patterns, ground into one of the selected Stalter Knives, provides you with trouble free operation. Send Stalter your pattern or sample.



Shaper knives made from Stalters premium shaper steel insures long lasting edges and safe operation.

Corrugated knives, ground-to-pattern, straight or bar length includes all of the five features of the Stalter knife making reputation and skill.

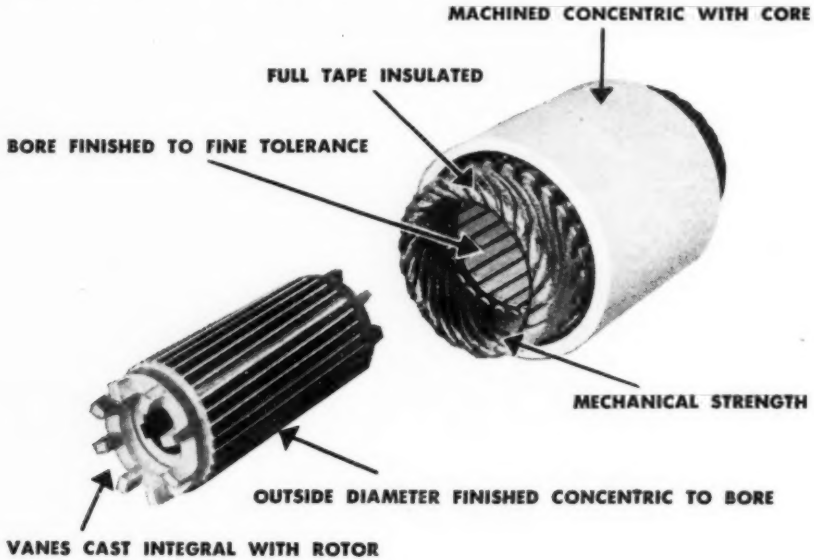


## Stalter EDGE TOOL CO.

GRAND RAPIDS, MICH.

*Serving the Industry Since 1852*

# WOODS SHAFTLESS MOTORS


MACHINED CONCENTRIC WITH CORE
FULL TAPE INSULATED
BORE FINISHED TO FINE TOLERANCE
MECHANICAL STRENGTH
OUTSIDE DIAMETER FINISHED CONCENTRIC TO BORE
VANES CAST INTEGRAL WITH ROTOR

The application of direct motor drive with WOODS' Shaftless Motors to high-speed spindles brings the peak of motive efficiency at relatively small cost. Conserves space—eliminates belts and gears—fewer wearing parts. The extensive and varied lines of WOODS' Shaftless Motors are available for nearly every class of direct application.

Let us tell you how you can achieve a reduction in production costs by direct motor drive.

**MOTOR DIVISION**

**S. A. WOODS MACHINE CO.**
**27 DAMRELL STREET**
**BOSTON 27, MASS.**

# *Announcing*

## *new*...Weyerhaeuser 4-Square Particle Board

YEARS in development . . . now ready for you . . . a new 4-Square Particle Board by Weyerhaeuser! Made of selected Douglas Fir particles, this attractive, new panel material opens exciting possibilities for a wide variety of manufacturing needs.

Weyerhaeuser 4-Square Particle Board is designed for use primarily as a core material. It is an ideal base for wood veneers, decorative plastics, metals. Because of its uniform density, dimensional stability and smooth surfaces, thin surface materials can be mounted under pressure without the usual transfer of core imperfections to the surface experienced with some core stocks. Machines beautifully, has satisfactory screw holding characteristics perpendicular to the surface and in edges. Excellent bonding properties. Sanded two sides, board is smooth and uniform in thickness.

Major uses include tops of all kinds, desks, tables, counters, sinks, cabinets and sliding doors, furniture, fixture and display parts. Available in different densities: $\frac{1}{2}$", $\frac{5}{8}$" and $\frac{3}{4}$" thicknesses. Standard panel size is 4' x 8', or board can be cut to your dimensions.

May we furnish samples, prices, engineering help?

### Weyerhaeuser Sales Company

***HARDBOARD DEPARTMENT***

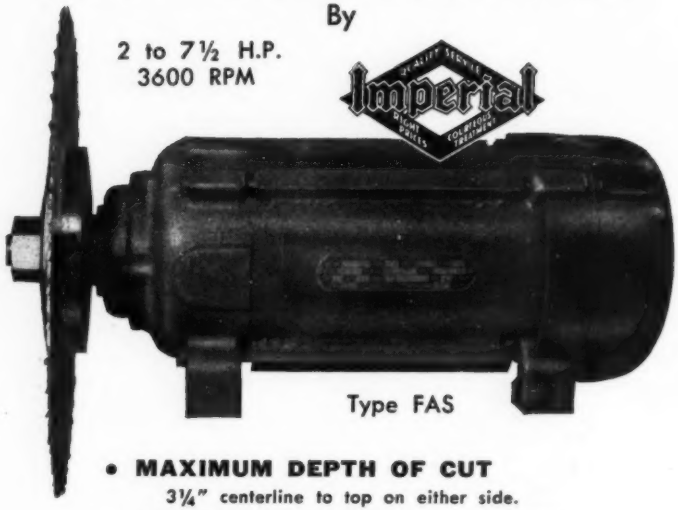
First National Bank Building • St. Paul 1, Minnesota

# *Precision*
# MOTOR ARBORS

By

2 to 7½ H.P.
3600 RPM

Imperial



Type FAS

- **MAXIMUM DEPTH OF CUT**
  3¼" centerline to top on either side.
- **ABSOLUTE RIGIDITY OF ARBOR**
  Massive arbor extension up to 2" dia.
- **SMOOTH CUTTING**
  Taper-mounted saw-flange and no end-play of arbor.
- **LOW OPERATING TEMPERATURE**
  Laminated stator-core directly exposed to cooling air stream.
- **DUST-PROOF**
  Totally-enclosed, fan-cooled construction.
- **SELF-CLEANING**
  No covers or other dust traps.
- **NO MAINTENANCE**
  Sealed ball-bearing prelubricated for life.
- **FIRE PROTECTION**
  Non-sparking fan and fan-cover.

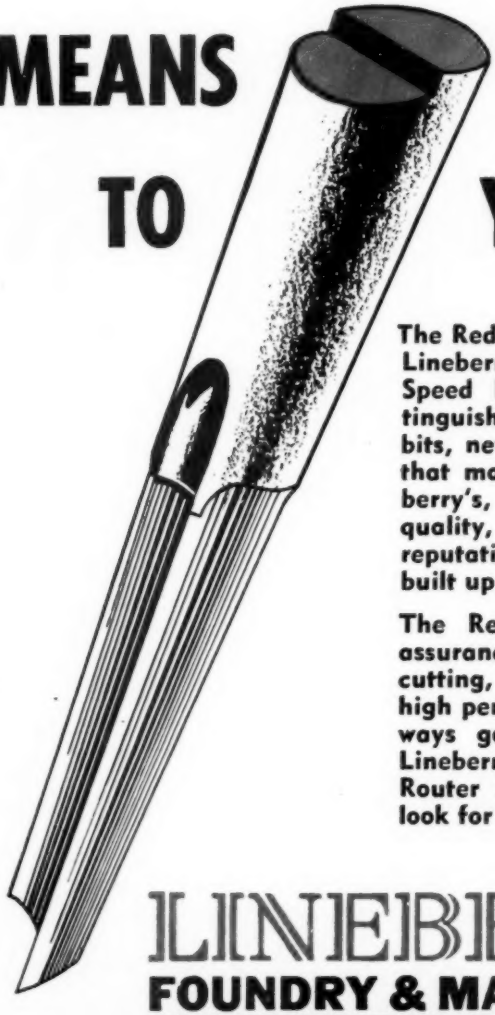
*Send for Bulletin No. S-51 to Dept. 6*

**THE IMPERIAL ELECTRIC COMPANY**

Main Office AKRON, OHIO • Factories in AKRON & MIDDLEPORT, OHIO

a little thing . . . that

# MEANS A LOT TO YOU



The Red Tang, now on all Lineberry Tungsten High Speed Router Bits, distinguishes these bits from bits, new on the market, that may look like Lineberry's, but lack the quality, toughness and reputation Lineberry has built up over the years.

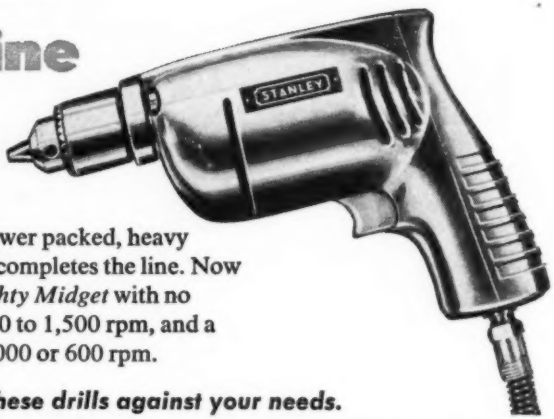
The Red Tang is your assurance of the fast cutting, true running, high performance you always get from genuine Lineberry Red Tang Router Bits. To be sure, look for the Red Tang.

LINEBERRY

**FOUNDRY & MACHINE CO.**

317 Forester Ave. North Wilkesboro, N. C.

# A new 'Mighty Midget'® rounds out famous line




No. 236 — ¼" chuck
— 1500 rpm

Every *Mighty Midget* is a power packed, heavy duty drill. The new No. 236 completes the line. Now you can get a ¼" chuck *Mighty Midget* with no load chuck speeds from 5,000 to 1,500 rpm, and a ⅜" chuck model rated at 1,000 or 600 rpm.

***Check these drills against your needs.***

| Drill No. | Chuck Size | Capacity | No Load Chuck Speed | Length Overall |
|---|---|---|---|---|
| 232 | ¼" | ¼" in steel<br>½" in hard wood | 5000 | 8⅛" |
| 233 | | | 3500 | |
| 234 | | | 2500 | |
| 235 | | | 2000 | |
| 236 | | | 1500 | |
| 237 | ⅜" | ⅜" in steel<br>1" in hard wood | 1000 | 8½" |
| 238 | | | 600 | |

Every *Mighty Midget* has anti-friction bearings, trigger switch with locking device and aluminum die-cast housing with high polish Stanley finish. Your industrial distributor is now able to demonstrate the whole line. Call him or write Stanley Electric Tools, 799 Myrtle St., New Britain, Conn., for further details.

**STANLEY**

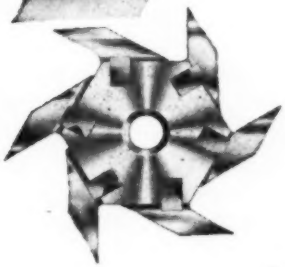
The Stanley Works • New Britain, Conn.

**ELECTRIC TOOLS • TOOLS • HARDWARE • STEEL • STEEL STRAPPING**

# "The one bright spot on our cost sheets!"

*"It's hard to find something to be cheerful about when you look at the average cost sheet these days. Maybe that's why we feel mighty good about the way our Jones & Orth Cutter Heads turn out the work for us, help us get bigger production per shift, and hold down costs!*

*"Change-overs and adjustments are quick to make too, and mechanical grief is practically unknown. Those heads sure get OUR O.K.!"*



**Hole and Plug Cutters**

Heavy duty cutters to make tapered plugs, or cut tapered holes. Write for details!

JONES & ORTH

CUTTER HEAD COMPANY

385 SOUTH MAIN STREET
MEMPHIS 3, TENN.

BOX 3064
SEATTLE 14, WASH.

Write Seattle or Memphis for the name of our dealer nearest you.

Catalog? You bet! Let us send you your copy! How else can we serve?

# HANDLE MORE BOARD FEET PER DAY with LEITELT LUMBER LIFTS

LENOIR FURNITURE COMPANY, LENOIR, N. C.

The many unexcelled features afforded by Leitelt equipment give a steady-paced flow of lumber at your first machine operation — thus maintaining a constant flow of stock through subsequent machines at a rate corresponding to their production capacities. This in itself is very important particularly where mechanized and conveyorized production set-ups can move more board feet than ever before.

Leitelt Lumber Lifts also work for you by saving manpower and relieving labor shortages. One man can handle a Leitelt Lumber Lift, feeding stock into single or double line systems.

Leitelt Lumber Lifts are available in a complete range of sizes to handle loads from 3 to 30 tons safely and easily. Each lift is made to fit your particular handling specifications.

***Write LEITELT today for more complete information***

**LEITELT IRON WORKS**

SINCE 1862

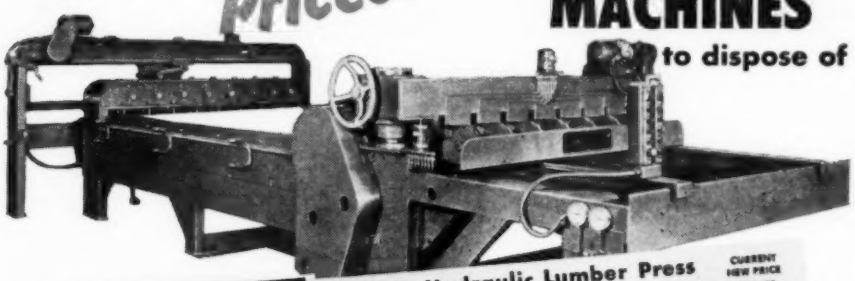
*"Pioneer Builders of Lumber Handling Equipment"*

*400 Mill St., • Grand Rapids 2, Michigan*

Manufacturers of Lumber Lifts, Car Pullers, Power Driver Turntables, Subcars and LEITELT Swing Tables

# Name Your Prices!

## We still have a few surplus WOODWORKING MACHINES to dispose of



. . . including this "LIKE NEW" Lumber Core Press

**PLYCOR Hydraulic Lumber Press**

**SPECIFICATIONS** 86", 14 ton continuous core press complete with automatic cross traveling rip saw and conveyor type glue spreader. Motors: 1 HP pump, ½ HP beam—adj. 10 HP saw, ½ HP carriage and 7½ HP feed. INCLUDES, 1½ HP Electric cooler to maintain constant glue temperature.

CURRENT NEW PRICE $35,000

OUR ORIGINAL SALE PRICE $22,000

**The following pieces are also available. Prices listed are today's new prices and our original Sale Price for comparison.**

*Make Us a Reasonable Offer!*

| Description | Current New Prices | Our Original Sale Price |
|---|---|---|
| • Porter Facing Planer, 36", Model 700 | $6,300.00 | $4,600.00 |
| • Whitney Double-Surfacer, No. 33, 40" (ball bearing) | 13,000.00 | 8,700.00 |
| • Diehl Edge Jointer, No. 660, complete with INFEED, RETURN FEED and TURN OVER | 6,735.00 | 5,100.00 |
| • Sheridan Veneer Clipper, 80", 5 HP motor | 12,000.00 | 6,500.00 |
| • Dennis Veneer Taper, No. 2, 36" | 2,300.00 | 1,150.00 |
| • Black Bros. Glue Mixer, 60 gal. capacity | 625.00 | 470.00 |
| • Black Bros. Glue Spreader, 80", 1½ HP motor | 3,000.00 | 2,000.00 |

| Description | Current New Prices | Our Original Sale Price |
|---|---|---|
| • Mattison Cross Cut Saw, 16", with conveyor table | $ 900.00 | $ 665.00 |
| • Onsrud Auto Shaper, Model W123 | 7,500.00 | 3,750.00 |
| • 2 Whitney Double Head Shapers, Model 39 | 2,400.00 | 1,500.00 |
| • Whitney Single Head Shaper, Model 182 | 1,800.00 | 1,200.00 |
| • Pico Dovetail Machine | 7,500.00 | 3,500.00 |

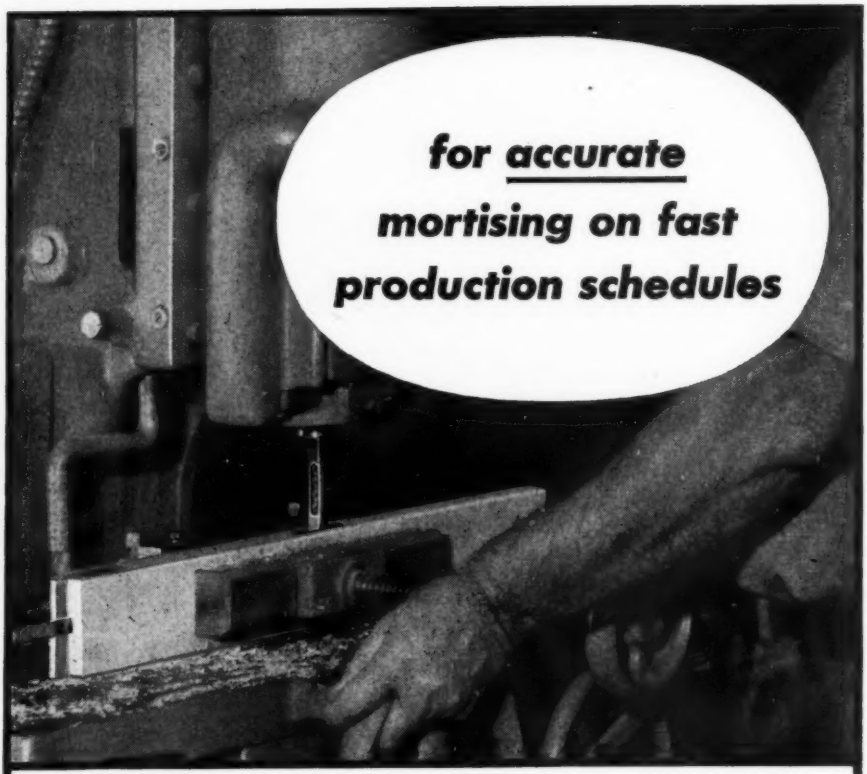
**PLUS**—Hall and Brown trim saw, Mauk single spindle shaper, Royle and Sons trim saw, 2 Handy thermo controlled banding clamps 72" x 48" x 18", 3 case clamps 48" x 27" open to 48", close to 15".

**PLUS** Several dust collectors and blowers and miscellaneous equipment.

**All Sales Subject to Your Approval Upon Inspection. Phone, Wire or Write Your Offer to**

**W. T. BRADFIELD** ROCK-OLA **MFG. CORP.**

800 N. KEDZIE AVE. • CHICAGO 51, ILL.




## get GREENLEE Hollow Chisels and Bits

Fast-clearing, long-lived GREENLEE Hollow Chisels and Bits add speed and accuracy to the production and assembly of your products. Made by the originators of the hollow chisel mortiser, these high-quality tools make "clean" mortises easily, swiftly, economically.

Available in a *complete* line for hard or soft wood and all makes of machines. Write today for new illustrated Catalog 34-M describing these and other GREENLEE tools for mortising, boring, and routing.

TOOLS FOR CRAFTSMEN
GREENLEE

**GREENLEE TOOL CO., Division of Greenlee Bros. & Co., 2139 Herbert Ave., Rockford, Ill.**

Tools for boring, routing and mortising • Hollow Chisel Sharpeners • And many others
Mfrs. of Teco Grooving Tools for Timber Connectors • GREENLEE Woodworking Machines include Tenoners • Saws • Mortisers • Borers • Planers • Shapers

# *From bare wood to finished job...*

# Black & Decker Speeds Your Work

*. . . by drilling faster and cleaner!*

**B&D 1/4" Heavy-Duty Holgun***

Now with *25% more power* to make faster, cleaner holes for better doweling, tighter assembly and neater work. Capacity: ¼" diam. holes in steel; ½" diam. in hardwood—greater capacity with Hole Saws.

*. . . by increasing accuracy, relieving fatigue!*

**B&D No. 12 Scrugun***

Features *50% more power* with choice of positive or adjustable clutch for faster, more accurate driving with less spoilage. Drives up to No. 12 wood screws, plus nuts, machine screws & self-tapping screws.

*. . . by keeping glue temperature uniform!*

**Black & Decker Glue Pots**

Precise thermostatic control *keeps* glue at proper 150° temperature, insures uniform assembly. Two-quart capacity and fast heating time speeds work. Sealed Nichrome heating element for longer life.

*. . . by eliminating hand sanding!*

**B&D Utility No. 88 Sander**

Here's an orbital sander to turn out satin-smooth jobs without hand sanding! Testimonials from professional woodworkers prove this. King-size 4½"x9" sanding plate extends beyond tool; allows sanding right up to obstructions.

* Trade Mark Reg. U. S. Pat. Off.

**DRILLS • SCREW DRIVERS • SANDERS**
**PORTABLE CIRCULAR SAWS • JIG SAWS**

***For FREE Demonstrations*** of these time-saving, cost-cutting tools, see your nearby B&D distributor—his address is listed in the telephone book Yellow Pages under TOOLS-ELECTRIC. For free catalog No. 10 write: THE BLACK & DECKER MFG. CO., Dept. 2709, Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

**Black & Decker®**

**PORTABLE ELECTRIC TOOLS** BD

# Balance

## IS ESSENTIAL
## in QUALITY high-speed production

# Diehl
# cutterheads are balanced!

Because every knife on a cutterhead is subjected to hundreds of pounds of centrifugal pull at *high speed,* balance *is* essential to quality production!

That's why Diehl Cutterheads have won top preference in the woodworking industry—for they *are balanced* . . . both statically and dynamically . . . on the finest dynetric balancer obtainable. And Diehl Cutterheads are built *to hold the edge and stand the wear* of high speed production—helping to insure quality!

Most sizes in Round, Square, Clamp T Slot and Vise Grip Heads are carried in stock . . . but Diehl is especially equipped to design and build special heads and cutters to solve unusual problems. Diehl's Engineering Department is always at your service.

To insure perfect balance and longer life, always specify Diehl Cutterheads. Contact your Exclusive Diehl Representative or the factory. Ask for Condensed Cutterhead Catalog—Bulletin No. 452.

**Standard of Comparison in the Woodworking Industry**

CUTTER DIVISION

THE G. M. Diehl MACHINE WORKS, INC.

WABASH, INDIANA • U. S. A.

# The Editor's Page

E. McDaniel

Editor

With Labor Day in the background, city streets and country lanes will be filled with the next generation slowly —and reluctantly—making its way back to the schoolroom. Before you receive the next issue of WOOD WORKING DIGEST, college classrooms and university lecture halls will also have received their quotas.

Naturally, we are interested in the young folk who are especially studying about our industry in schools of forestry. We would encourage still other young men to attend schools such as the John McClure School of The National Hardwood Lumber Association.

But let's be even more specific. How about sending someone from your plant to a paint school—Binks offers a number of them this fall; a dry kiln short course; or some other brief but concentrated period of instruction?

Why? Two reasons—better products through better ways of making them at lower costs, and alert employees.

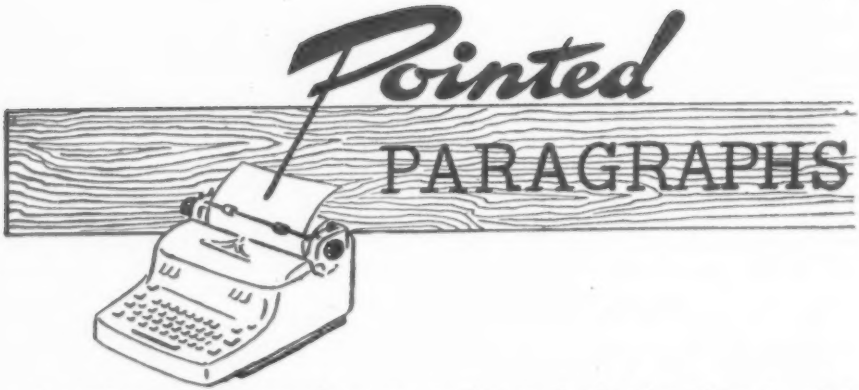
It was interesting to hear not long ago of a Chicago manufacturer who called together a group of workers. Out of the files certain drawings and models were produced. The short talk given to the group emphasized the thought: "This is what we've done in the past—done through the efforts of thinking young men like yourselves. Now what can we do to develop a new product? A better use? Etc."

One could almost hear the "wheels turning" as those young men filed out from the conference room. It will be interesting to see what that firm develops in days to come. Remember, it was somebody's idea to bend wood; to use thin layers of wood for plywood; and to glue small pieces together to make long lengths and broad widths.

Occasionally the articles appearing in WOOD WORKING DIGEST may seem a bit elementary—covering material many of you know. But we have in mind the hundreds of young men who are coming into woodworking plants each year.

Do something about employee education—on-the-job training—this year. See to it that your employees have the opportunity to read articles such as "Fundamentals of Wood Machining," and our furniture finishing series, along with many others. You may wish to order some of our technical booklets (page 88) for an employee library.

Spend a little time thinking about what your employee might profitably learn; make it easy for him to do so; and you'll find it raises employee morale, and may result in somebody in your plant coming up with an idea or two that will really pay off for your company.




**A number of important dates are coming up in October. Keep in mind that the National Safety Council Congress will be held October 17-21. The National Motel Show takes place October 24 and 25 and the National Hardwood Lumber Association convenes on October 11-13. All of these events will be held in Chicago.**

*National Retail Lumber Dealers Association is sponsoring a Materials Handling Clinic in Cleveland, October 11-14. Event will specifically demonstrate equipment in use.*

**Speaking of exhibits and displays, E. J. Stanton & Son, Inc., Los Angeles, came up with a unique idea. This firm has produced "Lumberama"—a dramatic way to build goodwill and sales. For a full day their plant remained in operation so visitors could see actual demonstrations of milling, kiln drying and handling techniques. Anyone attending came out with a greater respect for wood and a good friend of the sponsoring company.**

*A kitchen stove of hardwood plywood is one of the many unusual features of a "House of Tomorrow" built recently near Long Beach, Calif. The plywood kitchen range houses magnetic coils which set up eddy currents in the cooking utensils. This does the actual cooking. The utensils are suspended 2" above the surface of the stove by means of magnetic repulsion, and the wood range never gets hot!*

**A new electronics building of the Boeing Aircraft Company uses glued laminated wood girders and columns, and frame construction. Why so much wood? Steel would interfere with accurate testing. Wood won't.**

***National Wooden Pallet Manufacturers Association held a very successful meeting earlier this summer. In the first six months of 1955, the wooden pallet industry operated at production levels considerably above those of 1954. Association headquarters are the Barr Building, Washington, D.C.***

**Write to Robert H. Greenbaum, Program Officer, Technical Training Section, Division of International Education, Washington 25, D.C., if you are**

# Save Time Save Money

use

## DUO-FAST automatic TACKERS

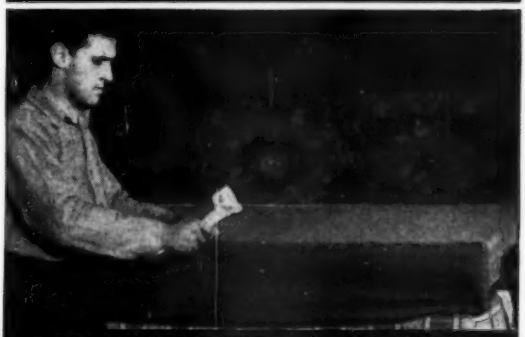
DUO-FAST AIR TACKERS cut production costs on case backs, drawer guides, and numerous other jobs.

MORE WORK, in less time, using fewer workers—that's the story on Duo-Fast Automatic Tackers and Staplers.

WIDELY USED in cabinet and woodwork shops, furniture plants, sash and millwork factories, toy makers, for a wide variety of fastening jobs.

A COMPLETE LINE of AIR TACKERS, HAMMER TACKERS, GUN TACKERS, STRIKE TACKERS, and AIR STAPLERS, including the model to save you time and money.

DUO-FAST GUARANTEE assures you of free service on Duo-Fast machines. An important money-saving feature.

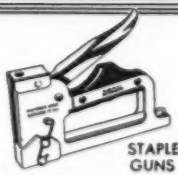


DUO-FAST HAMMER TACKERS speed and simplify many tacking jobs. One-hand operation.

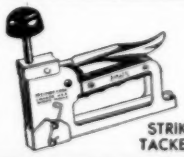
*50 Sales & Service Offices in Principal Cities*

**WRITE TODAY FOR YOUR COPY OF THE DUO-FAST CATALOG & PROFITABLE SUGGESTIONS**

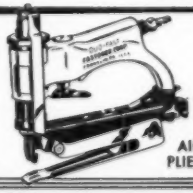
The *right* machine for each job is important. You'll find the *right* one in the **DUO-FAST LINE**



STAPLE GUNS



STRIKE TACKERS



AIR PLIERS

## FASTENER CORPORATION

858 Fletcher Street • Chicago 14, Illinois

**interested in helping with the training of three Philippino woodworking teachers. These three men are coming to the states in September and one phase of their training program will be to work in a company which reconditions, repairs or reconstructs woodworking machines.**

*Mid-1955 finds the construction industry operating at record levels with no sign of a downturn. There has been a very sharp reversal of the downtrend in industrial construction which followed the Korean War. The upturn this year has been broadly based, affecting nearly all major categories of manufacturing.*

**M and M Woodworking Company presented 1 square foot each of timberland in the Rust Tract, Del Norte County, Calif., to members of the National Plywood Distributors Association at their summer meeting. The stunt was in commemoration of fir plywood's Golden Jubilee.**

***American walnut outdistanced the field as the international award-winning material of 16 or 36 designs in the "Design in Hardwoods" award contest sponsored by the Hardwoods Exhibit, Ind.***

**Flooring statistics continue high for northern hard maple, beech and birch during the first half of 1955. Sales show an increase of 11.5%.**

***Plywood sales have tripled since the end of World War II, and there is no end in sight to the number of ways it can be used.***

Luncheon clubs offer an effective medium for betterment of public relations and widening understanding of wood products. It is surprising how little is known about lumber even in towns which largely depend upon it.

***United States Court of Customs and Patent Appeals has decreed that manufacturers and retailers cannot use the term "Academy Award" or the statuette, commonly called the "Oscar," in connection with products offered for sale. Academy of Motion Picture Arts and Sciences requested a decision to be made because the Oscar is both copyrighted and registered as its trademark.***

**Furniture manufacturers' shipments for the first half of 1955 show a gain of 20% over last year. The survey, conducted by the Southern Furniture Manufacturers' Association, also shows that the volume of business done during the first half of the year now slightly exceeds that of the peak year, 1953.**

***Mills participating in the trade program of the Hardwood Plywood Institute have increased their production by 36% for the first six months of 1955 as compared to the same period in 1954. The survey is based on returns from the identical 30 mills in the two periods.***

Super-resistant genuine hardwood surfaces will be introduced on a number of furniture lines at the January 1956 markets, according to the Fine Hardwoods Association. These surfaces are achieved by a combination of approved finishes and laminating a special pre-coated aluminum foil layer beneath the face veneer of hardwood plywood.

# Furniture Maker Cuts Fitting Cost 50%

## with SKIL ELECTRIC PLANE

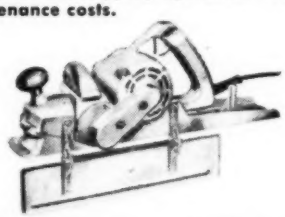
**Walco Industries, New Brighton, Minnesota**—Using former methods, a skilled workman required 30 minutes to complete TV cabinet finishing operations. Now, with this new SKIL 100 Plane, he can do the job in only 15 minutes—and obtain a more exact surface with no uneven sections!

This is just one of many examples of how SKIL Model 100 saves man hours, improves the quality of both edging and surfacing work. Almost as light in weight as a hand plane. See and try the new SKIL Plane at your distributor's today!

**PERFECT BALANCE: Unique placement of motor gives perfect balance of tool at all times, including edging and surfacing.**

**STRAIGHT CUTTERS: Simple to sharpen, less expensive to replace than curved cutters.**

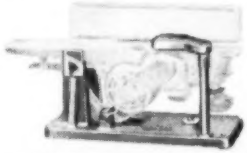
**TOOTHED-BELT DRIVE: Provides quiet performance, non-slipping operation—reduces maintenance costs.**



**Model 100 . . . $129.50**

**See your Distributor for Information, or Call Your Nearby SKIL Factory Branch**

**CONVERT YOUR SKIL PLANE TO A JOINTER-PLANER IN SECONDS**



**with new SKIL Plane Stand (Model 10750)**

For accurate smoothing, surfacing, beveling, and jointing of smaller work, convert your plane to a bench jointer-planer with SKIL Plane Stand. Quick, simple adjustment locks plane solidly into place. Spring safety guard.

SKIL PORTABLE TOOLS

Made Only by SKIL Corporation formerly SKILSAW, Inc.
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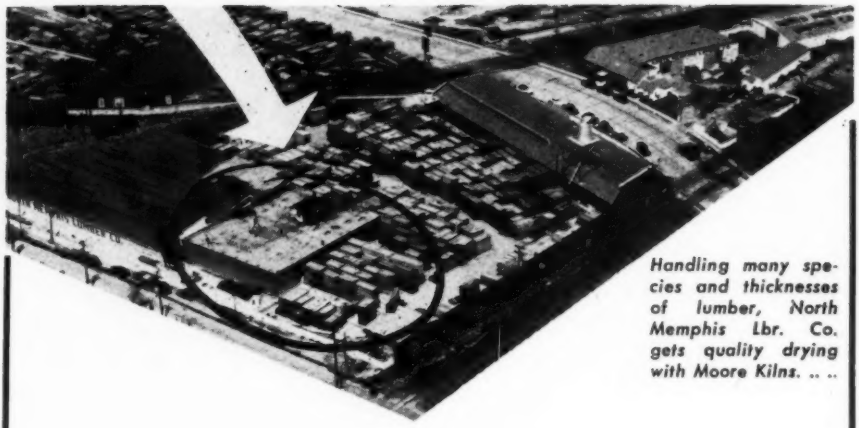
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in ALL Leading Cities



*Handling many species and thicknesses of lumber, North Memphis Lbr. Co. gets quality drying with Moore Kilns. .. ..*

# Why Do Leading Custom Drying Plants Depend on Moore Kilns?

It's no secret that custom drying plants—where QUALITY DRYING and CONTROLLED COSTS are watchwords the year round—prefer the proven Moore Cross-Circulation Kiln.

There are definite reasons for this preference:

More cubic feet of air per H.P. is produced by large multi-blade Moore Fans, turning slowly. Only one motor and drive located outside kiln operates entire fan system. All fans turn at identical speed, delivering identical volume of circulation.

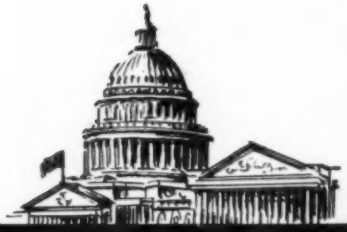
**Where Results Count, Choose Moore**

## MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

JACKSONVILLE FLORIDA | BRAMPTON, ONT. CANADA | VANCOUVER, B. C. CANADA | NORTH PORTLAND OREGON

# Comments



## FROM THE NATION'S CAPITAL

Action in the hardwood plywood import tariff situation is at stalemate, at this writing. The industry naturally is very much dissatisfied with the formal ruling of the U. S. Tariff Commission, and doesn't agree with the White House about the President's attitude. Obviously the Commission's expression of opinion after the hearings in recent months was, in effect, simply a reflection of what it knew would be the President's stand. There is little doubt that the essence of the investigation which gave the Commission the basis for its action was the result of the investigation by the White House itself.

There seems small question that those in the U. S. Tariff Commission familiar with conditions in the industry are aware that they are not as rosy as the ruling by the Commission, and the opinion of the White House, would imply. It was of course unfair and misleading to use the very much shrunken business of 1954 as a yardstick with which to measure the better business of 1955. And it is the 1955 business, in essence, that was utilized as the measure to determine that the hardwood plywood industry is in good condition, does a business that compares favorably with the needs upon which to base tariffs from Europe and Asia and that there is a real need for the imports from abroad to keep prices at home properly balanced.

It is interesting that some of the important agencies of the Federal Government which are devoted to the interests of industry, and which are familiar with the wood and woodworking industries, do not agree either with the Tariff Commission or with the White House. They see the unfairness of the method by which the ruling was fixed, and they think that the White House, which is really essentially responsible for it, either did not understand the situation, or was working in the interest of building up foreign trade to reduce the need for an increase in the distribution of tax money in Asia and Europe. Obviously these agencies can't be identified in any way. They feel that the use of the tariff to slim the distribution of relief funds is an evasion that will not work. They point out that whether the funds are distributed from the Treasury directly, or whether they are taken from industry and workers by means of such presumed adjustments as this tariff

ruling predicates, the funds still, in the last analysis, come out of the taxpayers' pockets.

These agencies of the Federal Government feel that the industry itself, to some extent, is at fault. They think that a more vigorous, direct, fighting drive against the manner in which the ruling was aimed at the industry, would have either stopped it altogether, or would have made a great difference in the manner of its effect. It is the thought apparently that the industry should make itself felt sharply and unmistakably, both at the White House and in Congress. The idea is that this is a time when no part of the machinery in Washington wishes to be flatly opposed to any important part of the economy or society of the United States.

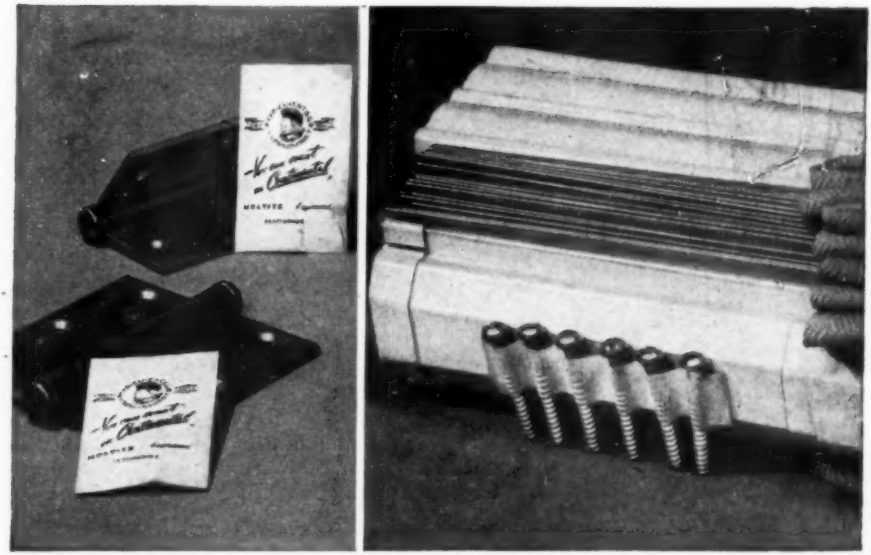
The national election that is immediately ahead has so many unknown equations that those who wish to rule at the White House, and those who wish to operate the machinery on the Hill, respond quickly to any obvious sincere pressure that is based on equity and will have popular approval. There is no doubt that those who are employed in industry, those who merchandise the material, those who are engaged in any phase of the business, can make themselves felt at this time and that they rarely can register their needs and their wants in the manner that is possible under existing circumstances and the circumstances that are ahead.

It is pointed out that the situation requires less legal adroitness than direct common sense in approaching the powers that want to be. This is a time when small groups of people with the will to accomplish something, who know their business and who know the politicians who form the committees in their localities and who formulate the policies which will have some attention at the national conferences and conventions, can get quick results. It is the time when the same sort of small groups in a locality or a state can get respectful and active attention from those who offer themselves as candidates for Congress or what have you, and who need funds and votes in the campaigns.

The point is to talk turkey to them in language that they can understand, not to go to them hat-in-hand. They need everything that the people who form industry and labor can give; and they can readily understand that the woodworking industry has had a pretty shabby deal in relation to this tariff business. Again, bear in mind it isn't a legalistic trade association job, it's a job for those who have the will and the drive to get out and register their desires with the people of first instance.

We are told here that the two forces which are most successful in flooding this country with cheap hardwood plywood products are, of course, the Japanese from Asia; they have practically shut out everything else from Asia, including the superior products of the Philippines. Next in importance are the imports of hardwood plywood and other forms of wood merchandise from West Germany. They tell us that daily the West German imports are increasing and are running far ahead of anything else that comes

# YOU CAN COUNT ON CONTINENTAL FOR EVERY FASTENER NEED!



## Continental's Envelope and Taped Screws Solve Problems when Fasteners Must Accompany a Product!

### Here's how they can ease some of your packaging difficulties

If your product demands the fasteners must be included with it, the chances are that Continental can help cut your handling costs. Continental's taped screws and envelope package screws have surprised many producers with time saving results. They eliminate costly hand sorting, short counts, and loose units in your package.

All tapes and envelopes are filled automatically by machine and can be printed with your trade mark and directions prior to delivery.

Continental also offers you many other cost-saving suggestions. It will pay to talk it over with them. Let them prove that you can *always count on Continental.*

**Continental Screw Co.**

Manufacturers of Holtite Fastenings

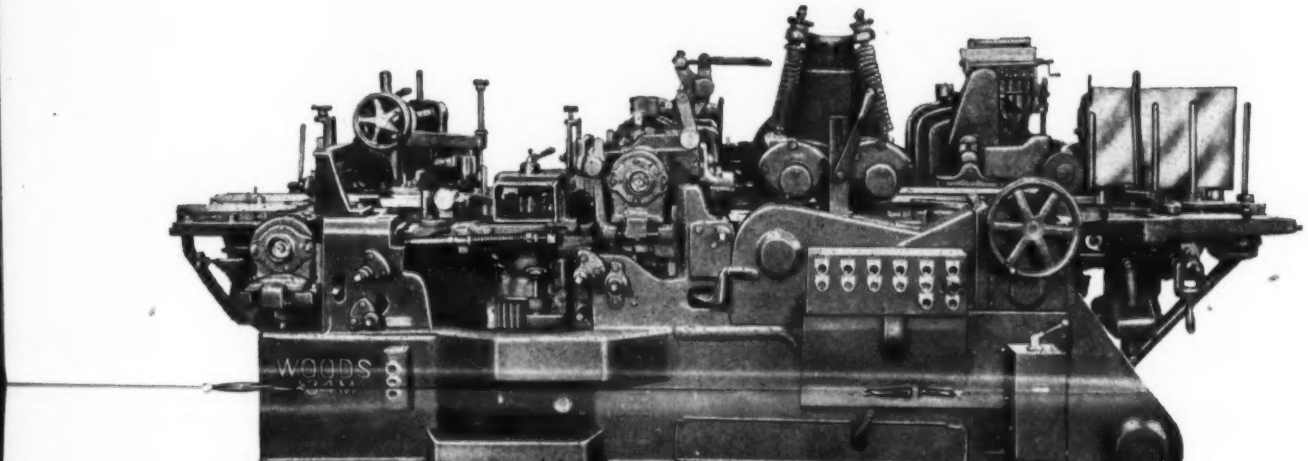
NEW BEDFORD, MASSACHUSETTS, U.S.A.

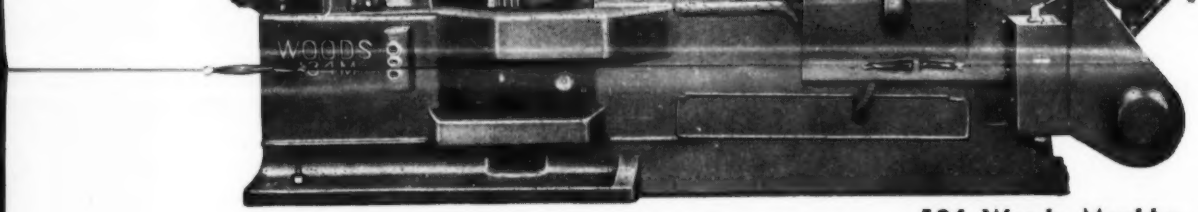
*Serving the Industry Since 1852*

*It's Marvelous!*

# This "LAG BED" MOULDER

*built by "The Moulder of Woods"* ®






134 Woods Moulder, shown with hopper feeding attachment

## Production depends on DESIGN!

From the forest to the finished product, *Leaders in the Industry* depend upon Woods "Lag Bed" Moulders for quantity and quality production. Among such Leaders are—

Oregon Lumber Company
Baker, Oregon

Standard Furniture Company
Herkimer, New York

Phillips Industries, Inc.
Orlando, Florida

Ozan Lumber Company
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Mutschler Brothers
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# S. A. WOODS MACHINE CO.

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Branch Offices: ARK., Little Rock CALIF., San Mateo N.Y., Mount Vernon ORE., Portland TENN., Memphis VA., Richmond

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Export Dept. United States Machinery Co., 90 Broad St., New York City

over the Atlantic Ocean. It is interesting, as well as curious, that trade relations with the West Germans have stirred up far less ill will than the trade relations with the Japanese, although the Japanese prices are far below those of the West Germans. Incidentally, Senator Sparkman, (D., Ala.), has urged that we ease restrictions on Japanese exports to Communist China. He thinks we should do it to put more money in the Treasury of the Japanese and to help the poor Chinese.

Under a law which the President signed shortly before he left on his vacation he is empowered to cut tariffs another 5% in each of the next three years on goods which reciprocate with similar concessions. The same law permits him to reduce by stages to 50% any duty rate that is higher than the tariff which he may cut 5%. Before leaving, the President ordered the State Department to set up tariff negotiations along these lines on a list of products early next year. It is hoped 35 nations will respond to the invitation.

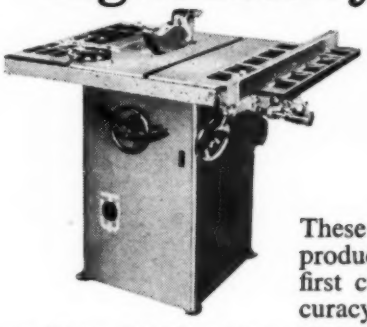
If you are interested in the operation of the Trade Agreements program send your request to the Secretary, U. S. Tariff Commission, Washington 25, D. C., for the latest document just issued covering the period from July, 1953 to July, 1954.

One of the last things the President did before leaving on his vacation was to sign the new $1 an hour minimum wage law. The new minimum wage, effective next March 1, was passed during the closing days of the last Session. It applies to 24 million workers covered by the Federal Fair Labor Standards Act. It is expected to mean wage increases for about 2,100,000 employees, mostly in in the South. The old minimum was 75¢. The President recommended a 90¢ minimum. Union Labor leaders urged $1.25. There were 49 different bills introduced to increase the minimum wage which may give some idea of its importance to the Members of Congress as a magnet for votes.

One of the most outstanding witnesses before the Congressional Committee was William Smith of Jackson, Alabama, who testified in behalf of the Southern Pine Industry Committee. He said that even a 90¢ minimum in 1954 meant that 58% of all Southern pine producers would have operated at a loss, and a $1 minimum would put 70% in the red. Most of the bill introduced called for $1.25. Several tried to increase the minimum to $1.35 per hour. Other pine producers, especially some from states of Washington and Idaho, appeared to fight the increase beyond 75¢. The Southern hardwood lumber industry which fought the $1 an hour wage, was represented by L. D. Kellogg of the L. D. Kellogg Lumber Company, Inc., Alexandria, La.; Mark Townsend of the Townsend Lumber Company, Stuttgart, Ark., and Charles Ransom of the W. A. Ransom Lumber Company, Harahan, La. Southern box and shook plants were represented. Tom DeWeese of the A. DeWeese Lumber Co., Philadelphia, Miss., told Congress that about 250,000 part-time and full-time workers would be affected.

It is anticipated that the next drive for legalized wage changes will be focussed on the Guaranteed Annual Wage, which has

# These **NEW** Walker-Turner "Light-Heavyweights" give you



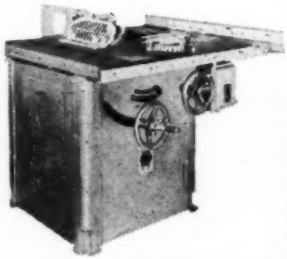
## BIG MACHINE PERFORMANCE at LOWER COST

These rugged new saws slice right through your production costs . . . start earning their way the first cut you make. Here's performance and accuracy you'd normally find only in much heavier, more expensive machines.

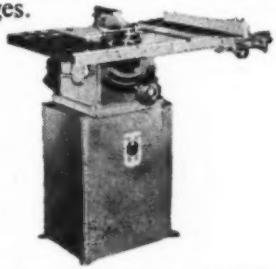
Faster, smoother production cutting is built right into these new Walker-Turners! Motor mounting and arbor *tilt as a unit*. Guard and splitter are always lined up with the blade for protection at any angle. Saw arbors mounted on precision ball bearings on all models.

Ask your Walker-Turner Distributor for complete specification sheet, and a demonstration of what these new saws will do for *you*. He's there to help you. You'll find him listed under "Tools" in your phone book's Yellow Pages.

**No. 2221 — 10" Tilting Arbor Saw** — Capacity: 3⅛" with 10" blade; 2⅛" at 45°; with 6" dado, 1⅛". Speed: 3800 rpm. Table: 32½" deep x 32" wide; 32½" x 45¾" with extensions. With 10" combination blade, extension tables, miter gauge, guard, splitter, motor pulley and belt (without motor) $297.00.



**No. 2450 — 14" Tilting Arbor Saw** — Capacity: 5" with 14" blade, 3½" at 45°; with 8" dado, 2". Speed: 3450 rpm. Table: 38¾" deep x 48" wide with extension. With 14" combination blade, extension table, miter gauge, splitter, guard, including 5 hp 220/440 volt 60 cycle 3-phase motor, with push button station. $946.50.



**No. 2121 — 8" Tilting Arbor Saw** — Capacity: 2⅝" with 8" blade, 1½" at 45°; with 6" dado, 1⅝". Spindle speed: 4000 rpm. Table: 23" deep, 19" wide; 23" x 37" with extensions. With 8" blade, extension tables, miter gauge, guard, splitter, belt, motor pulley and sub base (without motor) $192.00.

walker-turner

**WALKER-TURNER**

• DIVISION •

KEARNEY AND TRECKER CORPORATION

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DRILL PRESSES – Hand and Power Feed • RADIAL DRILLS
Wood and Metal Cutting BAND SAWS • TILTING ARBOR SAWS
RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS
BELT AND DISC SURFACERS • FLEXIBLE-SHAFT MACHINES

already been adopted by the automobile people as the result of Walter Reuther's efforts. There is a difference of opinion among Labor Union leaders about the application of this program. President Dave Beck of the Teamsters Union feels that it cannot be made general, that particularly it would destroy many small businesses, and would initiate a trend toward monopoly. Furthermore he fears that a Guaranteed Annual Wage program would cause the accumulation of vast GAW funds and that such accumulation would be exceedingly dangerous in many ways.

The Automotive Parts Manufacturers Association feels that a Guaranteed Annual Wage will close out smaller companies and probably force some of the larger ones into the sort of monopoly that may bring about a form of Fascism in this country. Frank Rising, General Manager of the Association, feels that the GAW plan would have to be administered by a joint Board of Administration composed of employers, union representatives and a chairman from the Federal Government. He feels that there would be necessity for plant boards, company boards and regional boards as well as a national board. He points out that such a joint management board would quickly become dominant in all industry decisions.

Almost at its close, Congress passed a bill extending the life of the Small Business Administration for two years. The new law permits loans of $250,000 limit instead of $150,000. If you wish you can obtain from the Small Business Administration, now, a Certificate which will formally attest that yours is a small business. The Certificate has value because it is an identification and it's binding on all Government agencies. Under the new law, firms may form pools for the purpose of acquiring raw materials; the SBA may now open regional offices in Alaska, Hawaii and Puerto Rico. Drouth is included as making one eligible for an SBA disaster loan. Under the new legislation for the next two years the SBA has a fund of $550,000,000 instead of $275,000,000 for its various fiscal needs.

The Hoover Commission, which made quite a study of the SBA, emphasizes that up to 29% of a small business man's time must now be devoted to filling out Government forms. The Commission ran across one small business man, who sells but one article of apparel; he is compelled to give the Government answers to 106 questions.

One of the legislative sources revealed that before 1946 legislative committees and subcommittees were so numerous and burdensome and duplicated or over-lapped each other's functions to such an extent that the Legislative Reorganization Act of 1946 reduced this committee structure to such proportions that a Senator was to serve on no more than two committees and a Member of the House on no more than one. But the latest report reveals that one Senator must take at least eleven committee assignments. It is becoming more and more impossible for any one to keep track of what is going on in Washington with the constant increase in committees. No one can see the proceeding in its entirety. Congress itself points out that this makes Government by minority-vocal, articulate, self-seeking minority, issue by issue.

# Laminated arches...PENACOLITE®-Bonded

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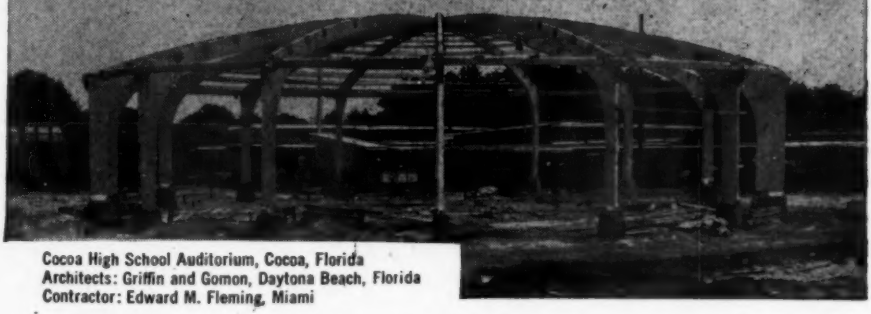

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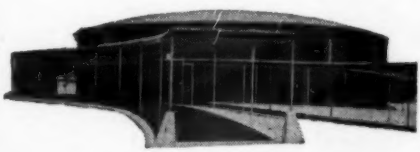

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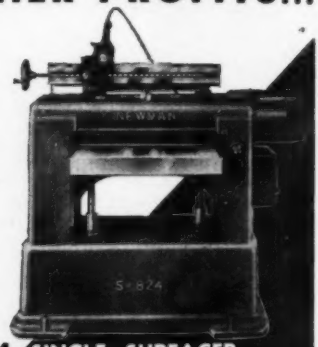

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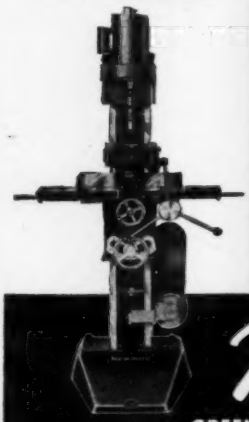

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# Lower Costs For MATERIALS HANDLING

By
Phil Hirsch

UNUSUAL materials handling devices have cut costs and improved production efficiency substantially at Yardley Box Co., Chicago custom manufacturer of wooden shipping containers.

Probably the most unusual piece of materials handling equipment in the plant is a 2,000 lb. capacity Hyster fork lift truck which is powered by propane (LP-gas) instead of the conventional fuel, gasoline.

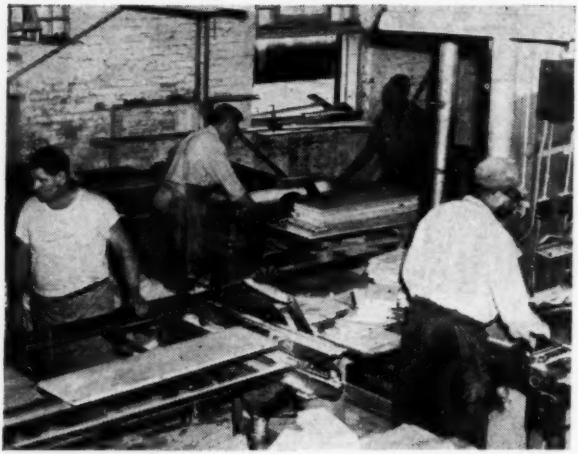
Propane, a by-product of oil refining, has been used in farm tractors and as a home heating fuel for many years. Since World War II, its use in industry for power tractors, lift trucks, and as a replacement for coal, oil, and electricity in specialized heating jobs, has been growing rapidly.

Propane has produced several benefits at Yardley. Most important perhaps is the fuel saving. Before settling on propane, the firm tried several gasoline-powered units. Consumption amounted to about a gallon per operating hour. Later, when the propane unit was purchased, Yardley officials found that consumption was the same. But cost of the propane is four cents less per gallon than the price of gasoline. As as a result, according to W. A. Yardley, head of the firm, the fuel bill has been cut approximately 17%.

Eliminating gasoline also has eliminated a serious fume problem. Operations are housed in an intensively-used 13,000 sq. ft. area with a comparatively low (15 ft.) ceiling, where work-in-process is piled 10-12 ft. high. These conditions inhibit the circulation of air. In winter, doors at the entrance to the plant and at the shipping platform must be closed against the weather, curtailing air circulation further. When the firm used a gasoline-powered lift truck, carbon monoxide fumes often settled in pockets around machines, causing headaches and discomfort to the plant's 25 workmen.

Propane gives off virtually no carbon monoxide, and only a light cloud of exhaust gases. As a result, conversion eliminated headaches completely. Yardley officials feel this benefit alone, because of the substantial increase in output per manhour it produced, has justified the investment in propane.

The lift truck's engine is supplied from a five-gallon propane tank mounted on the back of the vehicle. Under normal operating conditions, the tank is changed every other day. This is a simple chore performed by



*Stock begins trip through processing operations at three ripsaw-cutoff sets. Note metal arm held by worker in foreground, which moves work through saw.*

the operator. He merely: loosens a mounting screw, closes a fuel shutoff valve, uncouples the fuel line, and lifts off the empty tank, then puts a fresh one on and hooks it up. The firm's propane supplier calls once a week and replaces the empty tanks with filled ones. Yardley keeps three tanks in reserve to handle its needs between deliveries.

Cost of Yardley's propane-powered lift truck was $3,200, about $120 more than the same unit would have been if operated on gasoline. Company officials believe maintenance costs are only a fraction as much as they would be with gasoline. Oil is changed every 100 operating hours, and none has to be added between changes. In the 13 months Yardley has had its propane-powered truck, the engine has not required a major overhaul. The maintenance savings plus those for fuel in this period have just about repaid the

*Versatility of Yardley Box Co. lift truck is shown in moving palletized load of shook for small type metal box.*

*Lift truck is handling 120"x72" cover for large government-ordered shipping container.*

extra cost of the propane installation, according to Mr. Yardley.

The truck is used for two major jobs. One is to load finished boxes into highway trailers from nearby storage areas. Trip distance averages about 25 ft. Time and cost of this operation have been cut drastically.

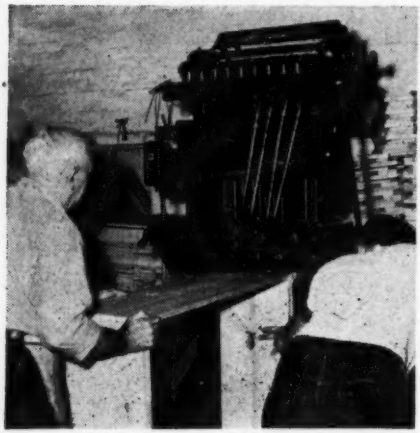
Formerly, boxes were loaded manually with the aid of a shipping platform elevator. The elevator raised loads about four ft., from the Yardley plant floor to the shipping dock—this is used by other firms in the same building. Frequently, the elevator was in use when Yardley had to move a load, forcing the firm's workmen to wait anywhere from five minutes to half an hour. Three to four truckloads left the Yardley plant daily. To fill each required the labor of four men for about two hours.

With the lift truck, loading is now accomplished by two men in 40 or 45 minutes, and there is no need to use the elevator; the lift truck's fork attachment has replaced it.

Biggest reason for the reduction in loading cost is the change in loading procedure made possible by the acquisition of the lift truck. Formerly the two men who stacked boxes on the truck had to walk to the tailgate to get each box. Now, one man does this job and the work comes to him instead of vice versa. For, as the lift truck stacks each pallet load on the tailgate, it pushes the pallet ahead toward the loader, forming a kind of conveyor line that moves from the tailgate toward the nose of the truck.

The lift truck's second job is to move work-in-process. For the most part, it services 10 automatic nailing machines, of Morgan Machine Co. and William S. Doig manufacturer, and an adjoining hand-assembly room where large boxes are fabricated. The nailers range from 9 to 18-nail capacity, and handle stock up to 48″ long. The lift truck moves box parts from storage areas to these machines for processing, then takes them away to other storage areas behind the loading dock. From these areas they are moved to outbound trucks. Trip distances traveled by the lift truck range from 25 to 100 ft.

The lift truck's versatility is indi-



*Firm is equipped with 10 Morgan and Doig automatic nailing machines. Largest unit (not shown) will handle stock up to 48" long.*

cated by the large-size stock it carries. One day recently, for example, it was toting parts into the hand-assembly room to be made up into two types of containers: one, for steel bar stock, measuring 22′ long, 7¼″ wide, and 3¼″ high; the other, a government order, measuring 120″x72″x36″.

Much of Yardley's work involves boxes this large or larger. Orders are comparatively small (usually under 2,000 units). Together with the rather congested manufacturing floor, these conditions make every square foot of storage area precious. The task of getting maximum utility from this space has been made much easier by the lift truck. As Mr. Yardley puts it:

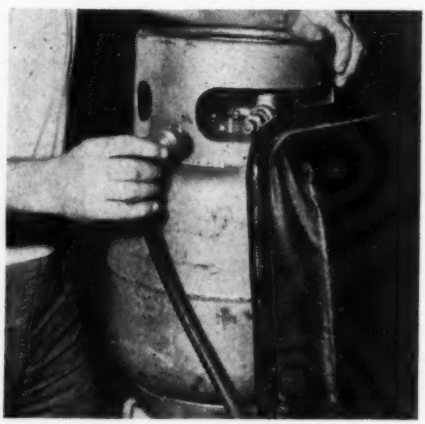
"Our lift truck has enabled us to store much more work-in-process in a much smaller area than would be possible by hand. The truck will lift a load automatically to a height of 15′ in a fraction of a minute. Conceivably the same job could be done by hand. But at least two men would be required, and it would take them far longer."

In production areas where box parts are sawed, prior to nailing, aisle width is only about 5′, too little for the lift truck to be used effectively. Part of the materials handling job here is handled by shop-built dollies, constructed from 3x4's and set on heavy-duty casters. They are used in conjunction with manually-operated, hydraulically-actuated skid trucks; capacity of the trucks ranges from 1,000 to 2,500 pounds.

The dollies vary in size from 24″ x 36″ to 24″ x 48″, and will take loads weighing a maximum of about 2,000 lbs. measuring up to 24′ long. One man is usually sufficient to move such a load.

The dollies and the trucks service three ripsaw-cutoff saw combinations, and a matcher, all manufactured by Mereen-Johnson. Each of these units is equipped with 3600 rpm motors.

Raw stock used in Yardley manufacturing operations (random lengths of



*Replacing five-gallon propane fuel tank requires only few minutes. One of the operations involved is uncoupling fuel line from nozzle opening on top of tank.*

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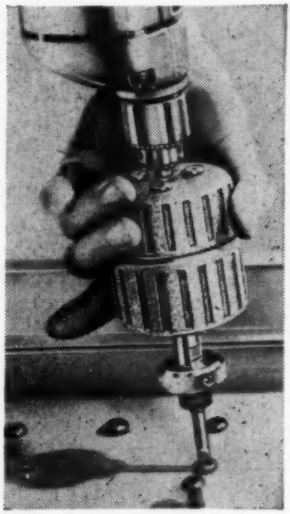

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About half of Yardley's material handling chores are performed by the hand-operated trucks and the dollies; the rest of the work is done by the lift truck. "In our operation, this is about as mechanized as you can get," explains Mr. Yardley. "Even though we can't use the lift truck in all production areas, we're convinced that it has played an important role in reducing the time and expense of moving work. Propane, by eliminating the serious problem of fumes, has probably been the key factor in the whole picture."

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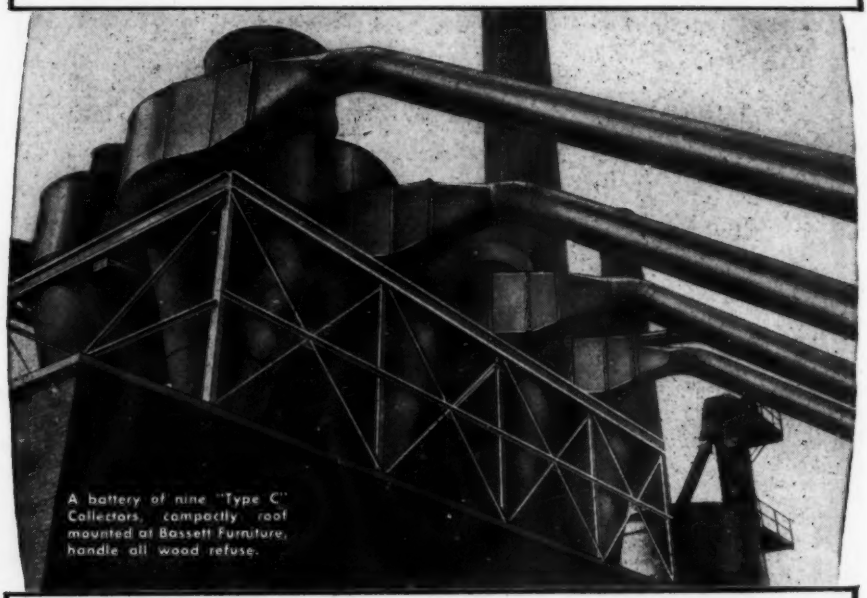

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# Fundamentals of WOOD MACHINING

By Carl Chekouras

ALTHOUGH there are thousands of wood machining cuts, this article will include only the more common.

## ROUTING

Beautiful contours as well as strong joints in furniture can be made with a router. Routing is done with a cutter having sharp cutting lips and revolving at a high rate of speed. (Figure 1). There are many pattern router bits. Routing machines are both stationary and portable, but the principle of routing is the same. Figure 2 shows some of the many routing cuts.

Routing is done at sometime in the manufacture of almost all wood products. Later the fundamentals of routing will be more thoroughly covered.

## CARVING

Not too different from routing is the operation known as carving. Carving is done with a cutter having the desired pattern, held to a spindle, revolving at a very high rate of speed. The stock to be carved is held to the cutter and guided according to the pattern being cut. Many appliques that appear to be carved are made of a material hot pressed into a pattern die to create like designs. Modern machines are in use that can carve many pieces at once and accurately duplicate. However, the need for hand carving is still prevalent.

## CHUCKING

A wood machining operation that we see every day but take for granted is that cut known as chucking. Handle ends machined to fit into brushes, tent poles cut to hold ferrules, male and female wood pipe joints, semi-spherical handle ends, etc., are examples of chucking.

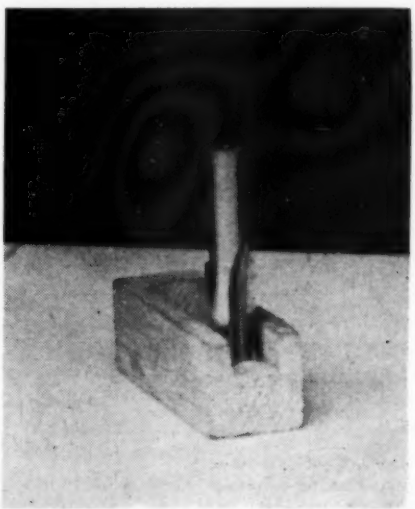

*Fig. 1. Router bit "cutting."*

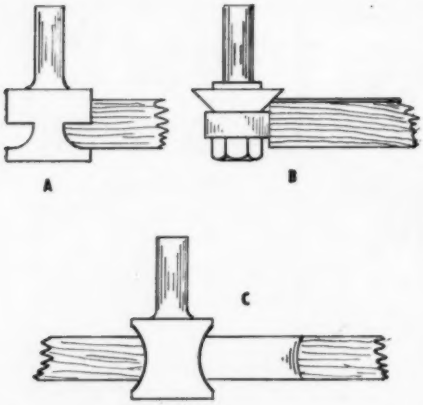


*Fig. 2. Three typical router cuts:*
*A. Cutting door lips with router bit.*
*B. Router bit with ball bearing guide to cut edges of Formica tops.*
*C. Cutting handholes in beverage cases.*

Although chucking can be accomplished on a lathe, fast production requires special machinery. A chucking machine is merely a cutterhead having two or more knives mounted directly on a motor spindle or an arbor. The various stock holding devices make the machine more complicated. Figure 3 shows some common chucking cuts.

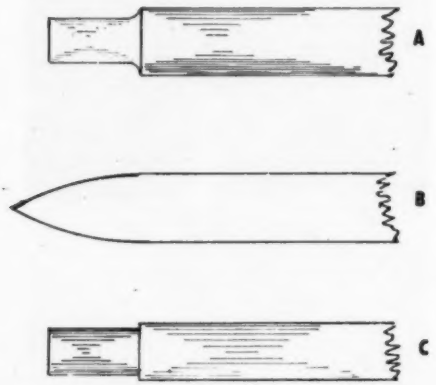


*Fig. 3. Chucking cuts:*
*A. Handle "chucked" to fit brush heads.*
*B. Pointed tent stakes.*
*C. Pole chucked for ferrule.*

## PICKET POINTING

The slats that go into the making of a wooden fence are pickets. To make a fence more decorative the slats are cut to points. This operation is known as picket pointing. There are many machines that can do picket pointing, but there is a machine designed primarily for such work. Some of the types of picket points are illustrated in Figure 4.

## SKIVE OR TAPER JOINTS

In preparing wood for lamination it is sometimes necessary to cut two pieces of stock so that they can be joined together. Using a butt joint, the stock would be weak and also unattractive.

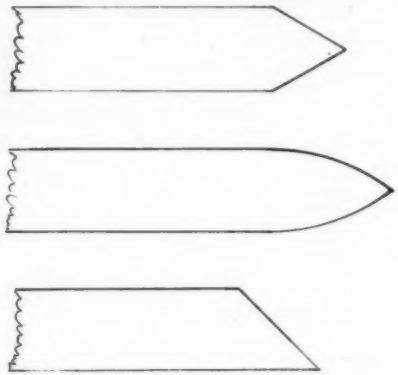

*Fig. 4. Some usual picket points.*

To overcome this condition a skive or taper joint is used. The loss of material strength, when using such type of joint, is very small. Figure 5 shows a skive joint.

## FRANKING

Rather than use a tenoner or coping machine for coping thin window muntin bars, this operation can be accom-

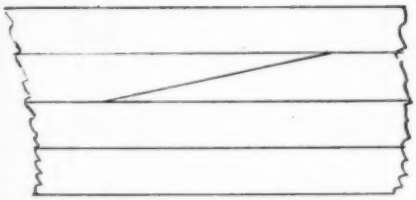

*Fig. 5. Skive joint used in laminations.*

plished with a machine known as a franking machine. The machine is foot operated and drives a formed chisel through the stock, cutting a pattern that matches the sticking. The principle of a franking machine is shown in Figure 6.

## POLE PEELING

Of the unusual wood machining cuts, that of pole peeling is one of the most unusual. A telephone pole that is turned to round is more durable as well as more desirable in appearance. A pole peeling machining can be compared to a large pencil sharpener having the cutterheads nearly parallel. As the poles are fed through the machine the cutterheads move further apart, causing the pole to increase in diameter according to its natural shape.

## EXCELSIOR CUTTING

Excelsior is not a waste product, but a manufactured product of great importance. It has been proven to be a highly successful and economical packing material. The manufacture of excelsior is confined to a few companies who have developed the fastest method of cutting the material. Figure 7 illustrates the method of cutting excelsior.

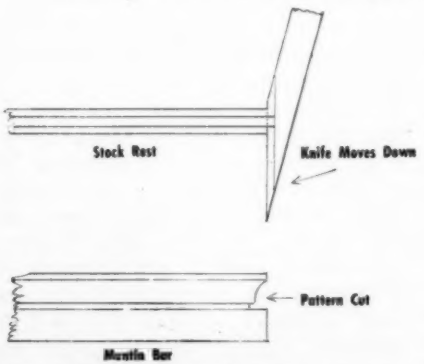


*Fig. 6. Principle of franking cutter.*

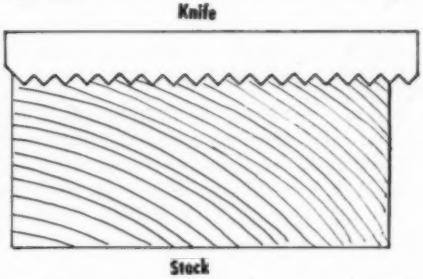


*Fig. 7. Excelsior cutting knife cuts in alternate positions.*

## ADZING

The original use of adzing was a process wherein logs were made into timbers. At present time, there is very little use for adzing except cross cutting a flat spot on railroad ties upon which the railroad tracks are nailed. The adzing machine has a revolving cutterhead holding two or more blades. The stock is then moved under the

*Fig. 8. Adze cut for rail plate on railroad tie.*

cutterheads and the flat is cut at that time. In order for this process to be economical it must be accomplished on a machine designed for this work. (Figure 8.)

## HOGGING

In order to dispose of wood waste it must be chipped up for burning or for further process of chipping. The machine for this work is known as a hog. The process of chipping up the

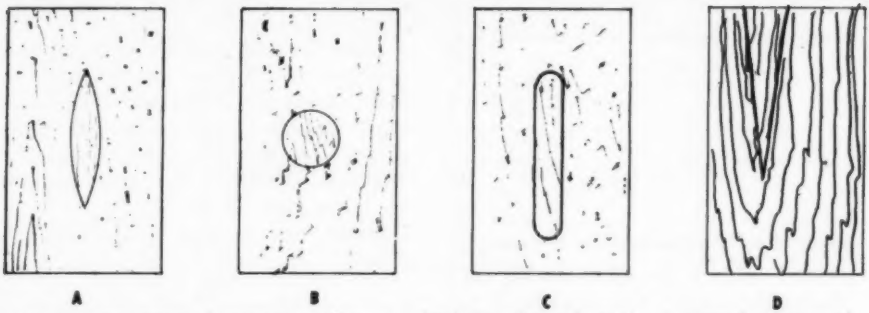


*Fig. 9. Four types of veneer patches: A. Oval Fir plywood patch. B. Round plug patch. C. Routed patch. D. Finger patch.*

lumber waste is known as hogging. This machine has a large cutterhead, holding knives, that revolves at a high rate of speed. The stock is fed into the machine and the knives chop the material into small pieces.

## CHIPPING

A similar operation to hogging is that of chipping. The difference being that the material is to be cut into even sizes chipped for further processing such as in the manufacture of chip board. One of the primary differences between a hog and a chipper is the fact that the chipping machine carries more knives. Secondly the chipper must cut even-sized chips.

## EMBOSSING

In the manufacture of picture frame stock, it is noticed that often the stock appears to have been carved. The carved effect can be produced by pressing the stock with an embossing roll attached to a moulder of an embossing machine. The pattern to be pressed into the wood is carved into the roll and as the roll turns, flame is applied to it, causing it to become very hot. As the stock passes under the heated roll, the pattern is pressed into the stock. Checkers, dominoes, blocks and many novelty items are embossed. Of course, actual carved picture frames are still made.

## PATCHING

If it were not for patching veneer, many pieces of plywood would be lost in manufacture. There are many types of veneer patching used, but the basic idea is the same. When a flaw shows up in a finished piece of veneer, it has to be patched according to its grade. Fine furniture veneers can be so patched that the flaw is not noticeable when the item is finished. Figure 9 shows several types of patches used in veneer patching. Skillful woodworkers have been successful in patching solid stock as well as veneer.

## PLUGGING

Recently new machines have been introduced that can drill out such flaws as small knots and also cut a plug of the same material, glue it, and press it into the drilled hole. Although plugging has been used for sometime, it is only recently that automatic plugging has become popular. There are any number of specialized machine cuts such as used in present manufacture and in the nearly forgotten trades, such as wagon making, that will be discussed along with the further explanation of individual machinery.

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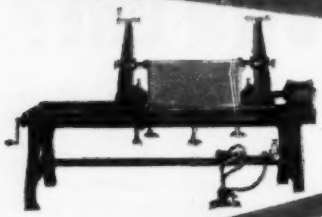

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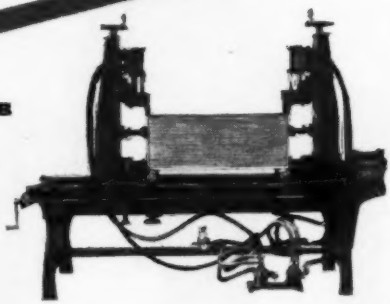

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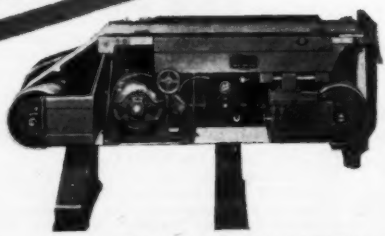

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Packaging lumber has cut down on the number of trucks needed and increased the number of loads—from 16 to 18—per day for one firm. Where seven men were formerly employed, four men can do the work with steel-strapped lumber.

*Figure 1.*

A Kansas City lumber company solved a difficult packaging problem with steel strapping. This firm uses telescope fibre boxes to ship odd lengths and widths of fine hardwoods and plywoods. This "refined lumber" is sold to the do-it-yourself enthusiasts. The steel strapped packages (Figure 1) protect contents, simplify stock keeping and make storage easy.

*Figure 2.*

Box shook can be shipped more easily if it is packaged right. Figure 2 shows an operator using an Acme Steel pneumatic stretcher to apply steel

*Figure 3.*

strapping to a bundle of cleated box shook. Each bundle contains 40 cleated units. The bundles are moved by a fork lift truck at this Louisville wooden box company to a boxcar for shipment.

An Oregon firm packages sheet veneer for safe, low cost shipment to mill customers. Strapping holds veneer securely and prevents damage to the load. Figure 3 shows operator loading a "package" with truck. Loading and unloading time is saved and the straps can be quickly cut when material is needed.

A Missouri firm packages 12 lengths of oak flooring to a bundle. Figure 4 shows assembly of strips into bundles. Steel strapping machine is semi-automatic. It tensions, seals and cuts the strapping in one swift operation.

Figure 5 shows a flexible packaging method used by a Michigan furniture manufacturer. The furniture pieces are wrapped in corrugated fibre board, put on skids and strapped. This packaging method is easily adapted to a variety of sizes and shapes of furniture. By adapting this method, packing time

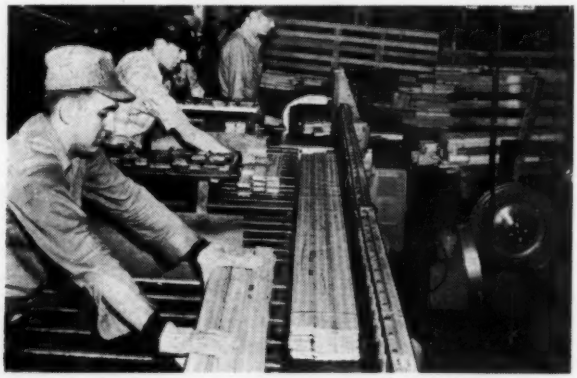


*Figure 4.*

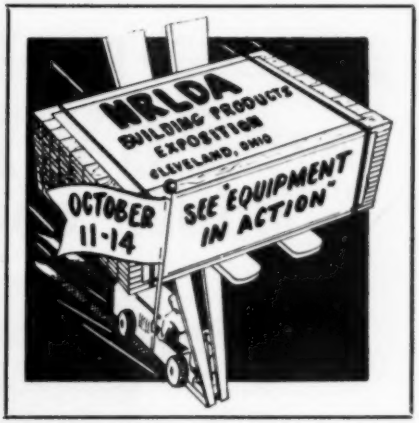
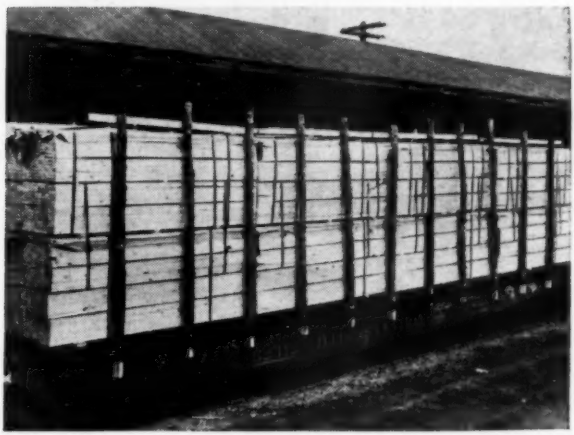



*Figure 5.*

*Figure 6.*



was cut by one third and shipping weight was reduced by 40%.

Individual sections of lumber (12" high) are bundled securely with steel strapping, Figure 6. Strapping is also used to interlace the top and bottom section in each stack. Strapped lumber is simple and fast to unload from rail cars—already stacked for storage.

**Photographs by courtesy of Acme Steel Company.**

Lathe, fencing and window sash are other applications where steel strapping has paid off in reduced costs and less time.

---

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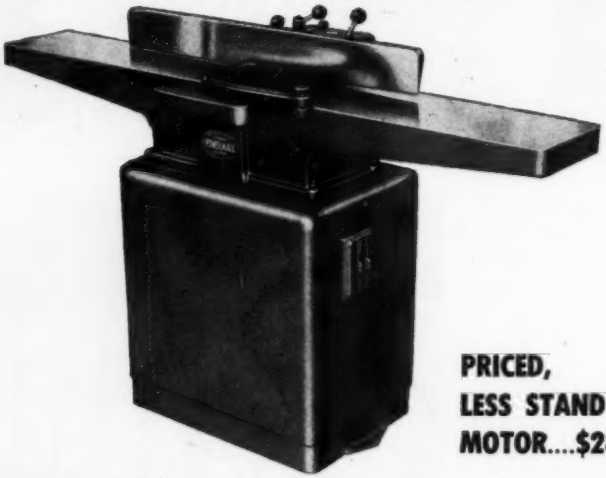

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# LEGISLATION EFFECTS TAX SAVINGS

By

H. E. Carroll

**Congress recently passed Public Law 74 . . . and eliminated some tax savings of the Internal Revenue Code of 1954. Here are some of the ways this act may affect your income taxes.**

WOODWORKING plant management has plenty of income tax headaches. Now, Congress has added another problem to the tax situation . . . repealed part of the Internal Revenue Code of 1954.

Public Law 74 repeals Sections 452 and 462 of the 1954 Code. These sections provided woodworking plants with an opportunity to bring tax accounting into line with regular business accounting methods.

In addition, there were some first-year tax savings involved. In fact, according to government estimates there were too many savings involved. These sections (452 & 462) would reduce income tax revenue according to Treasury estimates. Thus, the sections dealing with prepaid income and estimated expenses were eliminated through the repeal provisions of Public Law 74.

Check the following questions and answers to see if they apply to your woodworking plant's tax reporting. If they do apply and you act now, you will avoid interest charges, penalty payments, and some income tax headaches.

### *Are all woodworking plants affected by Public Law 74?*

No! You are only affected by the repeal of sections 452 and 462 if you took advantage of these new provisions in the 1954 Code. To do this you should have been on an accrual tax reporting basis and have established reserve accounts for prepaid income and for estimated expenses. If you have been reporting your income taxes on a cash basis (and followed the same procedure last year), Public Law 74 does not apply to your woodworking plant's income tax report.

### *When does Public Law 74 become effective?*

According to the published version of Public Law 74: "The amendments made by this Act shall apply with respect to taxable years beginning after

December 31, 1953, and ending after August 16, 1954."

Thus, you will find that your last year's tax return, if it took advantage of these tax saving opportunities, must be adjusted to take into consideration the repeal of Sections 452 and 462. The effective date of Public Law 74 is retroactive and has the same effect as if the provisions had not been included in the 1954 Code.

***What should a woodworking plant that used these two sections last year do to meet the requirements of the repeal?***

There are two things you must do to be sure you are in the clear on the repeal of sections 452 and 462:

1. You must prepare a statement showing your increase in your income taxes as a result of not using sections (452 & 462) which are repealed.

2. You must file this statement at the place fixed for the filing of your regular income tax return.

***When should this statement be filed?***

Your statement showing your increase in tax due must be filed on or before December 15, 1955.

***What information should this statement include?***

According to the specific wording of Public Law 74, this statement shall "include such information necessary or appropriate to show the increase in the amount of the tax required to be paid for the taxable year by reason of the enactment of this Act."

To be on the safe side, it is suggested by tax experts that the statement show the reported amount on the 1954 tax return and the calculations without the benefit of sections 452 and 462. The tax should then be computed under the new provisions and the difference between this and the amount paid last year shown.

***When must the difference between the tax paid and the amount due be paid?***

The repeal of sections 452 and 462 specifically covers the date for filing the statement and paying the difference in the tax due under the repealed provisions as follows: "The taxpayer shall, on or before December 15, 1955, file a statement and pay the amount due for the difference by reason of the enactment of this Act."

***If a woodworking plant owes additional income taxes as a result of this repeal, will extra interest be assessed?***

No! Section 4b (3) of Public Law 74 states: "If the taxpayer, on or before December 15, 1955, files the statement and pays in full that portion of the amount shown thereon for which the last date prescribed for payment is before December 15, 1955, then for purposes of computing interest (other than interest on overpayments) such portion shall be treated as having been paid on the last date prescribed for payment."

Thus, even though the repeal of Sections 452 and 462 eliminates some income tax savings, it does make a provision so a woodworking plant does not have to pay interest for this late payment of taxes. This is only fair because firms made their tax payments using these two sections in calculating 1954 taxes in good faith.

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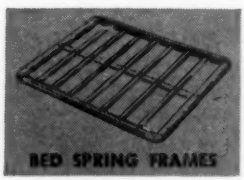


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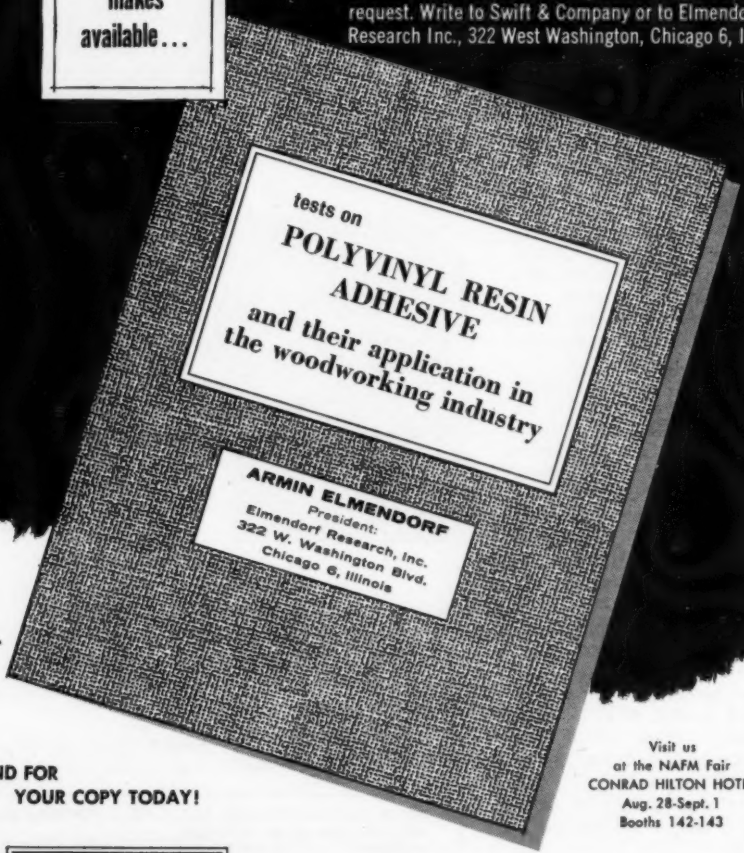


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# PHOTOELECTRIC EQUIPMENT

By John Hyler

SINCE it was first developed, photoelectric equipment, or the so-called electric eye, has been put to a considerable number of uses throughout industry. It is as much available for use in the woodworking industry as elsewhere. These devices incorporate a light source, throwing an electric light beam on the electric eye, or photoelectric cell. So long as this light beam is unchanged in quality, or uninterrupted, nothing happens. If the light beam is interrupted, or cut off, however, it causes a photoelectric relay to function. By this means, a circuit is closed, causing a motor or other device to perform the desired duty.

On the other hand, the arrangement may be such that a machine is functioning regularly, so long as the light beam is uninterrupted, but when it is interrupted, the circuit operating the machine motor is broken, causing it to come to a stop. Since the device may be used either way, it is highly versatile. The electric eye has often been used to open a door at the approach of any person. Where this is done, the light beam is set in such a way that the person approaching interrupts it. In like manner, a door can be opened for an approaching truck, and this is sometimes done.

From this, it will readily be appreciated that an electric eye can be used to guard against intrusion. It can be arranged in such manner that it is not noticeable. Whenever an intruder interrupts the light beam, it can be made to sound an alarm, either at a near or distant location. Thus, the electric eye may be employed to assist the night watchman, if desirable.

## STOPS GLUE SPREADER

An edge-type glue spreader is one place in woodworking where the electric eye is definitely employed. It is used in conjunction with electronic gluing equipment. The particular glue spreader observed carries material, set on edge, forward over a glue-spreading roller, applying glue to the lower edges. When material advances to a point where it is ready to be placed in the gluing device, if it is not promptly removed by the gluing operator, it will interrupt the light beam, and stop the glue-spreader conveyor.

Thus, material is always at hand for an operator to feed into the gluing equipment, but the electric eye always functions to prevent any of it from over-running the end of the conveyor, or prevents a large amount of it from piling up at the operator station. In a similar manner, a photoelectric cell

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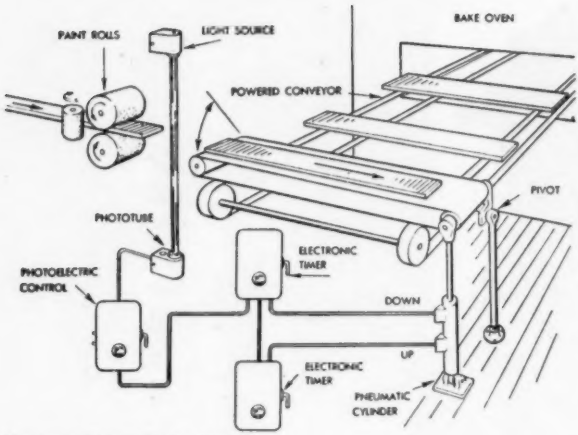



***Figure 1. Photoelectric application in finishing.***

Courtesy Photoswitch, Inc.

may be made to control any conveyor at any point, once material has been carried to that point and is not removed.

Photoelectric cells may also be used for counting. In this case, pieces or parts passing on a conveyor interrupt the light beam in turn. Each time it is interrupted, it actuates a counting device. Photoelectric counters are used in various places.

## USED FOR SORTING

Also, the photoelectric cell is used as a sorting device. Such cells may be used to sort thinner material from thicker, removing either the thicker or the thinner from a conveyor, while the other class of pieces are allowed to move on. Similarly, it can be employed for sorting material above and below a given specific width. In other instances, photoelectric cells are employed to sort material for length. This is made use of in some cases in sorting cut stock, where it is being cut to different lengths by use of multiple cut-off gages. In such a setup, different

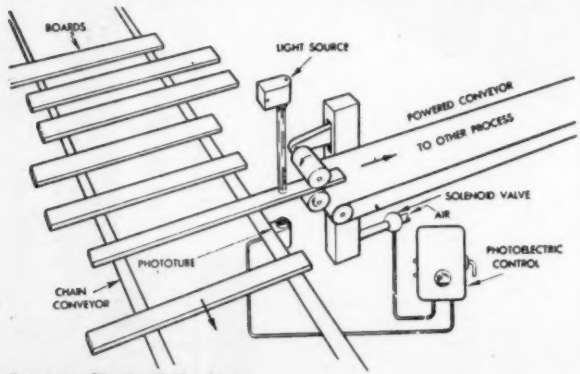
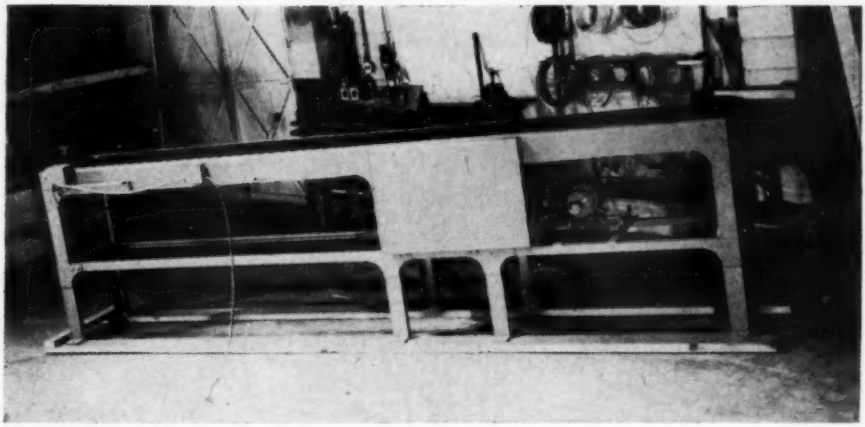



***Figure 2. Sorting boards at the green chain can be accomplished with photoelectric equipment.***

Courtesy Photoswitch, Inc.



Courtesy Union Tool Corporation.

***Figure 3. Flow of material may be regulated with photoelectric equipment.***

lengths of material can be pushed from a conveyor at different points. From these points they proceed to their own predetermined machines or stations.

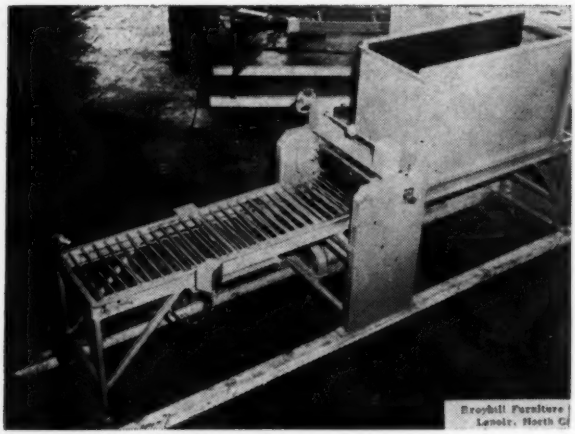
Another aspect of photoelectric sorting is very interesting, and has to do with changing the quality of a light beam reflection, rather than interrupting the beam. Photoelectric cells can be made so sensitive that they will react by the manner in which light is reflected from different colors. They have been used, for instance, to sort dark-colored objects from light-colored ones. It would doubtless be possible, on this basis, to sort dark-colored woods from light-colored ones should the occasion arise, though we know of no such installations.

Four utilizations of photoelectric equipment are shown in this article. In the first figure, photoelectric application shows a transfer control for painted boards.

A building material manufacturer wanted to feed freshly-painted (roll-coated) boards automatically into an infra red baking oven for fast drying. Each board is hand fed into the coating rolls, which paints the top surface and the two edges of the boards. Emerging from the coater rolls, each board is received on a section of gravity conveyor, hinged for side tilting. This conveyor section is tilted sidewise by an air cylinder, sliding the board by gravity on an oven conveyor, without touching the painted surfaces.

Control of conveyor-section tilting by allowing the painted board to contact mechanical or limit switches was not practical, since any such switch contacts would smear the fresh paint. However, a photoelectric control and two electronic timers have solved this problem.

The photoelectric control is located between the coating rolls and the gravity conveyor, the light source being above and the photoelectric cell below. As the board passes from the coating rolls, it interrupts the control beam. When the last end of the board passes beyond the beam path, the photoelectric




Courtesy Union Tool Corporation.

*Figure 4. Conveyor type glue spreader at Broyhill Furniture factory.*

control starts the first timer. The timing period is just long enough to allow the board to travel from the coating rolls to a point above the oven conveyor.

At this point, the timer operates the "up" solenoid of the air cylinder, which tips the gravity conveyor section, and the board slides off on the oven conveyor. The second timer controls the interval during which the gravity conveyor section remains tipped before returning to the horizontal position. Any change in board length requires new positioning of the boards on the gravity conveyor section. An adjustment for this purpose is made as need appears, simply by re-setting dials on the first timer.

Sorting for grade at the green chain is an operation well known at larger sawmills, but in many places the lumber grader must manually remove boards from the chain, lifting a considerable part of their weight in the process. For some time, so-called Electric Swedes have been in use in some of the mills. These incorporate a pair of pull rolls, so the grader need only pull boards about a foot endwise, when he wishes them removed at a given point. Also, devices more crude than the Electric Swede have been improvised for this purpose here and there.

More recently, different places make use of a photoelectric control to operate the pinching action on a pair of pull-off rolls used for this purpose, as indicated in Figure 2. The grader pulls boards of a given grade about one foot out of line endwise, just as though an Electric Swede were being used. When the extended board end breaks the photoelectric beam, the control actuates air cylinders, which function to move the rolls toward each other enough to grip the board end. The rolls then slide the board transversely down a gravity conveyor. Unlike other devices which have been used, the the photoelectric control responds unerringly, and practically no maintenance is required.

One interesting use for photoelectric equipment is in starting and stopping a conveyor which is an integral part of an edge glue spreader, often used with other high-production edge-gluing

On 5-ply birch-veneer desk tops...

# Carbide shaper knives double production rate

Carboloy Grade 883 carbide trims 5/8" radius on 3,000 desk tops before regrinding; steel cutters dulled after only 200 pieces. Carbide cutters are sharpened only at beginning of day; steel cutters had to be changed 5-6 times daily.

**Tough 5-ply** birch-veneer desk tops caused production headaches at American Seating Co., Grand Rapids, Michigan, because they dulled steel cutters after only 200 pieces. This meant changing knives on the Onsrud automatic shaper 5-6 times a day. Grinding costs were high; scrap was piling up.

But when Carboloy® Grade 883 carbide was substituted for steel, production rate doubled, daily downtime was eliminated, scrap rate was reduced to almost nothing.

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equipment. As glue-spread material (destined for the electronic press, continuous-feed edge gluing press, or other clamping equipment) reaches the end of the conveyor, it intercepts the light beam (unless it is promptly removed by the man feeding the clamping equipment), stopping the conveyor until he does remove it. Thus, glue-spread material is always kept at hand, but none ever runs off the end of the conveyor. The conveyor-type glue spreader, Figure 3, is thus equipped. The photoelectric equipment is visible at the far left end.

Highly interesting ultra modern glue spreader of conveyor type, which is both hopper fed and equipped with photoelectric cell and light source. Figure 4 shows one of four hopper-fed glue spreaders used at Broyhill Furniture Factories, Lenoir, North Carolina. The photoelectric cell and the light source can be seen located diagonally across the conveyor from each other at the left hand end.

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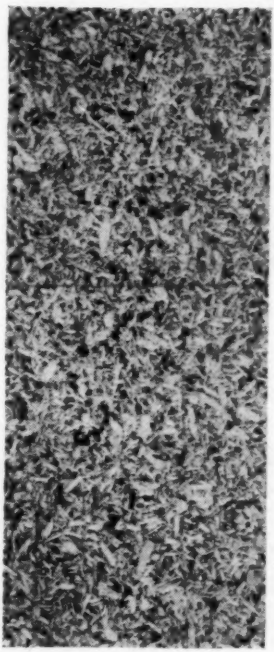

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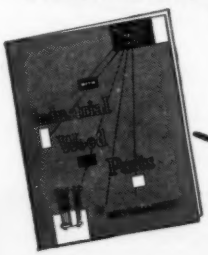

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# Is Your Plant Fireproof?

**By Porter Taylor**

*Sidney Marder*

*"We've learned our lesson. The new plant is fireproof throughout."*

*Harry Friedson*

IT is not always possible to trace the cause when a fire breaks out in a plant. However, one woodworking firm has learned that it pays to take every possible precaution in order to insure welfare of workers, plant production and investment in material and finished products.

Damage estimated at $100,000 was caused by a fire which destroyed the plant of Well-Bilt Products, Inc., cabinet manufacturers at Hialeah, Fla., earlier this summer. Exact cause of the fire has not been determined.

It was early in the morning that the crew reported for work. One painter had gone into the paint shop when a flash fire started, almost trapping him in the shop. One of two theories suggests that a spark from electrical connections set off the paint; or some sort of spontaneous combustion. Normal precautions had been in effect. Metal fans and other metal equipment were of a non-ferrous material. Fire extinguishers were also on hand, but it was impossible to keep the flames within the shop.

About 40 employees, in the building when the fire started, managed to get out safely. One spray gun operator narrowly escaped being trapped in a small booth. Six fire-fighting units kept the blaze from spreading to adjacent buildings. However, the blaze was so intense that it was impossible for employees to close the fireproof doors in the painting department.

Eight hours later, firemen were still pouring water on the smoldering ruins. The building, valued at $50,000, was covered with $15,000 insurance. Sidney Marder and Harry Friedson, owners of the business, found their losses very heavy—$50,000 loss in cabinet inventory. This figure does not cover the loss of time or of business.

Suitable rental quarters for the firm could not be found. Therefore, Well-Bilt has purchased a new building,

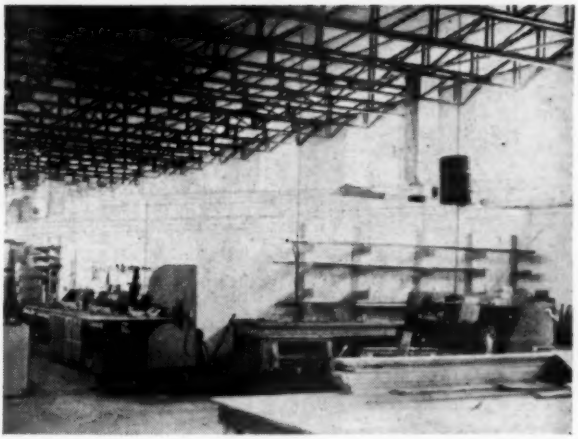
*Fire destroyed building completely. Not even the walls of this concrete block structure were left standing.*

thus enabling the company to be back in production within one week of the fire.

Extra precautions have been taken to make the new shop fireproof throughout. The entire paint shop is in a cement block, concrete covered compartment. The entire compartment is insulated with asbestos plaster and sheet metal. Fireproof doors, 600 lbs., are used at all openings in the paint shop and drying rooms. Two intake fans and two exhaust fans, with a capacity of 8800 cubic f.p.m., keep the new shop pressurized; and in the event of fire, the exhaust fans could help to keep it from spreading outside the shop.

In addition to this, all paint not in use is stored in a fireproof vault outside the paint shop. Only the paint in the spray guns is in the shop. Thus, if a fire should break out in the shop,

*New building for Well-Bilt Products in Miami, Fla.*



*This is an over-all view of the paint shop. It is inside a separate structure at the Well-Bilt Products' new plant.*

there is very little likelihood of damage to the rest of the plant.

The present building has 16,000 square feet in comparison to the 12,000 square feet in the former building. Located at 5561 N.W. 36th Ave., Miami, the building has all new equipment and is currently producing twice as many products as the old plant did.

*Ray Strong (left), foreman of finishing department, stands in the doorway of the new paint shop which has pressurized ventilation.*

An expensive experience, but both owners say they have learned their lesson from the $100,000 fire!

**SAFETY COURSE**

To meet the increasing need of industry for continued safety programs and practices, a new home study course in Industrial Safety Engineering has been added to the curriculum of International Correspondence Schools, Scranton, Pa.

With the increased use of automatic machinery and processes, management has become increasingly aware of the safety problem. The new I.C.S. course is an engineering approach to the solution and study of this problem.

Comprised of 41 lessons requiring an estimated average study time of 650 hours, the Industrial Safety Engineering Course provides instruction in mathematics, machine sketching, blueprint reading, industrial psychology, handling of materials, plant and production equipment layout, and safety principles and practices.

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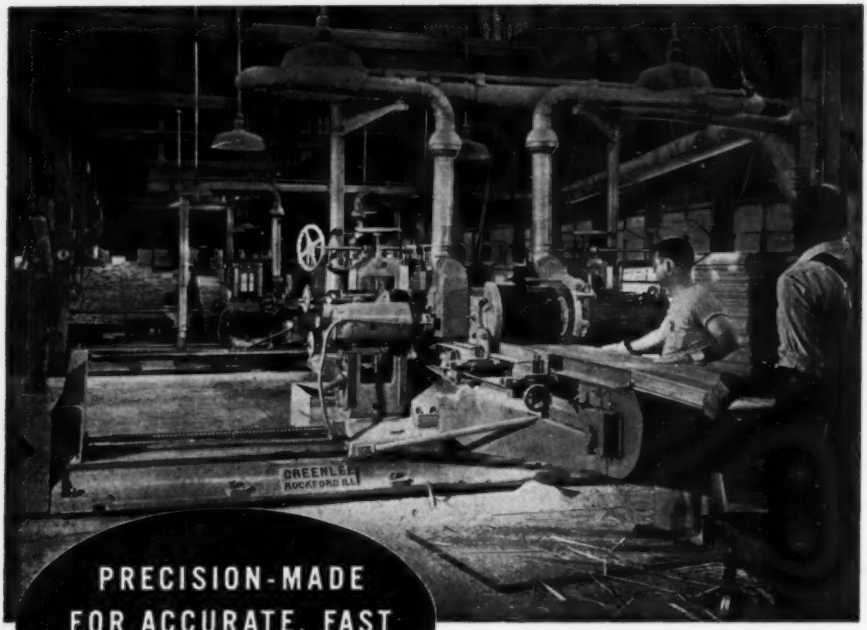
A professional is a man who does his job when he doesn't feel like it.

An amateur is a man who can't do his job when he does feel like it.

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# Right or Wrong?

**A roundup of day to day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to WOOD WORKING DIGEST.**

### *Can employees be required to "Work" during rest periods?*

**What Happened:**

The company had a policy which allowed for 2 ten-minute rest periods. It had a group of 4 employees whose job it was to tend some furnaces. During rest periods, the men, according to the company, "were supposed to take advantage of lulls in their work to take it easy and to smoke, etc." They were also permitted to send somebody to the "wagon" for refreshments for the group. While they weren't required to do active work during these rest periods, the management felt that these men should sort of keep a watchful eye on the furnaces to see that nothing went wrong. The workers didn't agree. It was their contention that rest periods meant freedom to leave one's post and to be free of responsibility.

Were The Workers: Right☐ Wrong☐

**What Arbitrator Charles O. Gregory Ruled:**

". . . A rest period is really not such if all responsibility is not removed; and it certainly is not removed if the men are asked to relax while standing by the furnaces in order to see that nothing goes wrong. The arbitrator thinks it was up to the company to take a position on such rest periods and to allow them in the sense that the men involved could, if possible, procure complete relaxation. This virtually implies their being able to get away from the furnaces entirely, by having them turned down for a ten-minute period twice a day, so that all of the group may relax at the same time."

### *Does "Seniority" give a worker a right to pick the best shift?*

**What Happened:**

W. O. Garrett worked on the second shift. After three years he was given a raise and reclassified to a higher skill. It so happened that another employee by the name of J. C. Driver was doing the same work as the promoted Garrett, but he was on the first—and preferred —shift. But Garrett had more length of service. So he insisted that because of his promotion and higher seniority he should be transferred to the first

shift. The company said that a man cannot exercise his seniority rights on shift preferences—seniority is applicable only in "promotions, demotions and layoffs." And besides, management has the inalienable right to schedule employees and assign work. But Garrett came back and charged that the company had always given senior men shift preferences, and that contract or no contract, a precedent had been set.

Was Garrett: Right ☐ Wrong☐

**What Arbitrator Alex E. Ralston, Jr. Ruled:**

"In interpreting the collective bargaining agreement, the arbitrator must look not only to the literal language, but also to the modes of action that have grown up around it over the course of time. In this case, for many years, it has been the practice of the company to accord senior employees in a classification, shift preference. This has not been treated as a right reserved by the company which it granted to some and denied to others at its discretion. The evidence discloses no prior instances when a senior employee was denied shift preference. It is therefore the view of this arbitrator that the grievance of W. O. Garrett must be sustained."

***When can't you deny "Holiday Pay" to an employee?***

**What Happened:**

In most companies a worker is paid for a holiday only if he works the day before and the day after. This particular company had such a rule in effect. It did, however, have this exception: holiday pay will be given even if the employee doesn't show up the day before or after where absence is due to sickness, death in family, or "similar good cause." The day after July 4th, a national holiday, 17 men came to work as usual. They were greeted by their supervisor who told them that the department was shutting down because a wildcat strike in another part of the plant had created a shortage of materials. When payday came around, the 17 who had reported for work found no 4th-of-July pay in their envelopes. They immediately tramped over to the paymaster and asked, "What gives?"

The paymaster had a ready answer. They didn't work the day after a holiday so they are not eligible for holiday pay. True, there was no work, but that wasn't the company's fault. Other employees had gone out on strike and therefore those who reported had to take the consequences of the illegal stoppage. The company's policy defi-

nitely limited the exceptions to "sickness, death in family and good cause." A strike, preventing these men from working, was not good cause.

Was Management: Right ☐ Wrong ☐

**What Arbitrator Ralph T. Seward Ruled:**

"The purpose of the holiday pay policy is clear. It is an attack on the perennial problem of pre-holiday and post-holiday absenteeism—an effort to discourage employees from stretching a holiday into two or three days absence from work. Its concern is strictly with the individual action of individual employees. At any rate, the arbitrator finds the failure of the employees to work the day after July 4th was for "good cause." None of the workers were themselves responsible for the fact that they did not work their turn. There was no effort to stretch out a holiday, no disregard of working schedules, no failure to fulfill their responsibilities. Insofar as was within their power, the grievants did precisely what they were supposed to do to qualify for holiday pay. They came to work. Regardless of the reason for the shutdown, these employees were not responsible for it. The men are entitled to pay for the holiday."

---

**WOODEN TRACKS**

Ever hear of wooden streetcar tracks? Well, they had 'em in Salem, Ore., years and years ago, according to the National Lumber Manufacturers Association. In fact, workmen digging a water main ditch in Salem recently unearthed a stretch of wooden streetcar tracks which hadn't been used in 40 years. The men said the tracks were still in excellent condition.


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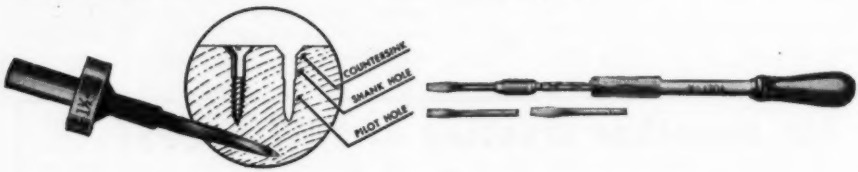


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# Evolution of LUMBER DRYING TECHNIQUES and DRY KILNS

**By Paul H. Graham**

KILN roof requirements are so numerous and exacting that no single material is able to meet them all satisfactorily. Therefore, a combination of materials is used in the construction of this most important part of the kiln building, to make it structurally sound, weatherproof, waterproof, resistant to heat loss and decay, and to assure long life in service.

Good insulation is most important, as a poorly insulated roof will have a tendency to cool the kiln air to the dew point to cause condensation and resultant leakage into the kiln and onto the lumber to upset uniform drying conditions within the kiln.

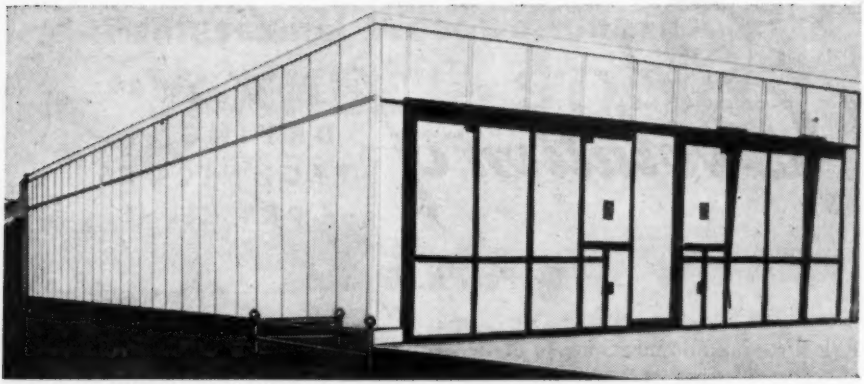
Dry kiln roofs are usually made flat on the under or ceiling side to insure maintenance of uniform air circulation. They are also built nearly flat on the upper surface in most kilns of modern design, with a pitch of ¼″ to ½″ per foot. Builders report that satisfactory results have been obtained with a pitch as little as ⅛″ per foot, if the roof is properly constructed. Popular basic materials for kiln roof construction are wood, reinforced concrete and tile, and concrete.

The conventional wooden kiln roof is usually of standard joist or crib construction, quite similar to constructions used for building wooden kiln walls. Crib construction is sometimes referred to as laminated construction and is designed for applications where a slow-burning structure is required. Material used is usually 2″x8″ stock laid on edge, with adjacent members spiked firmly together.

Where initial cost is an important consideration, wooden joists are used, of proper size for the span (usually 2″x10″ or 2″x12″), spaced from 16″ to 24″ on centers and well bridged, and are sheathed with 1″ roofers over the top and a ceiling of 1″ matched lumber over the bottom. The layer of matched ceiling lumber nailed to the underside of the joists is usually covered with a suitable vapor barrier (roll roofing, aluminum foil, etc.) placed either directly over the underside of the joists and covered with sheathing, or placed between two layers of sheathing in the ceiling construction. A vapor barrier may also be prepared by attaching asbestos board to the ceiling with brass screws. Asphaltum or other kiln paint is usually applied to the face of the ceiling to increase its protection and make it moisture-proof.

## ROOF INSULATION

The joints are then caulked and pitch may be poured over the ceiling



Courtesy Standard Dry Kiln Company.

***Two Standard Dry Kiln Co. internal fan kilns housed in prefabricated aluminum insulated kiln buildings. These kilns are each 104' long with all controls being located in a pit at one end of the kiln.***

boards. Usually the space between joints is partially filled with loose insulation, such as asbestos, rock or mineral wool, ground cork, etc., allowing for adequate ventilation between ceiling and roof. Ventilation must be provided for best results, due to the decay hazard.

The layer of roofers over the top side of the joists may be covered with 3-ply or 5-ply tar felt, or a more substantial construction is provided consisting of a layer of roll roofing or composition material mopped down with asphalt, covered with asbestos board, corkboard, fiberboard or a layer of 2" sheathing, and topped with suitable composition roofing material.

Some kiln roofs are built entirely above the joists without the conventional ceiling on the underside. Where they are not adequately insulated, these roofs sometimes require a separate roof heating system, with independently operated heating coils suspended immediately below the ceiling side to prevent condensation.

Modern kiln builders appear to prefer to separate the roof from the ceiling by an adequate air space or even an attic between them. Insulation is used over the ceiling, and the attic space is ventilated to remove moisture passing through the ceiling. Good insurance for longer roof life is obtained by treating the wood used in construction with preservative solution to protect against decay.

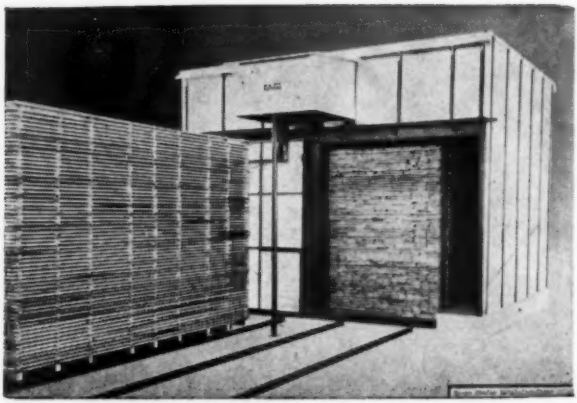
In typical wooden kiln roof constructions, with and without ceiling, component arrangement from ceiling to roof (underside to outside) is:

Roof without ceiling:

Joists and bridging, 1" matched sheathing, vapor barrier, 1½" corkboard insulation or two layers of ¾" fiberboard or two layers of matched lumber, and composition roof.

Roof with ceiling:

Asphaltum kiln paint, 1" matched sheathing, vapor barrier, joists and bridging, 4" level of loose insulation, 1" roofers, and 5-ply tar felt and composition roofing.



*New Moore prefab kiln building features new type panel joint construction to eliminate vapor leakage at panel joints.*

Courtesy Moore Dry Kiln Company.

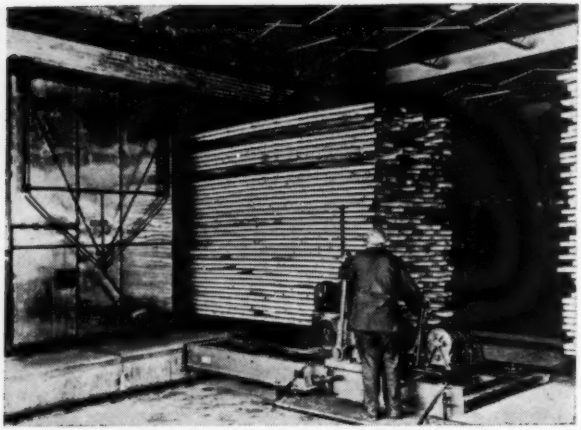
Terra-cotta kiln roofs are usually made of terra-cotta hard-baked tile, separated by reinforced concrete beams. 12″ tile is generally used in this application to provide a smooth ceiling on the underside. The roof is finished in the conventional manner, with vapor barrier, insulation and roofing felt, with suitable expansion joints provided over wall bearing sections.

A typical tile roof construction uses 12″ and 2″ combination of terra-cotta lip tile and reinforced concrete. Some builders specified 12″ tile for roofs in cooler sections of the country and 8″ to 10″ tile for warmer climates, where reinforced concrete joist and slab roof is used. Insulated on the underside with tile, this smooth tile ceiling exposes no concrete for condensation.

The top surface of the concrete slab is covered with a 5-ply tar roof, with layers swabbed on with pitch or mopped down with asphalt, and the top covered with gravel or slag. Insulation is also provided by covering the base concrete slab with cinders, insulating board, etc., and covering with a thinner slab of concrete before the roofing is added.

Where fireproof roofs are required, reinforced concrete roof construction may be used, consisting usually of concrete beams covered with concrete mixed to provide required insulating, weatherproof and waterproof properties. Special concrete mixtures, such as Zonolith, are available for this application. Aggregate mixtures are also used to reduce heat losses, as concrete naturally has a high heat loss value and requires good protection. Thickness of the concrete roof slab is governed by the thickness required to be structurally safe, usually about 6″. Expansion joints are provided at proper intervals over the bearing walls.

Adequate weather protection is sometimes afforded by built-up felt laid over the concrete slab. It is applied by covering the finished reinforced concrete slab with a vapor barrier of three or more layers of roofer's felt mopped down with asphaltum or pitch, and topped with a substantial layer of gravel or slag spread on top of the finished roof.



*A single door carrier and transfer car service a bank of kilns.*

Courtesy Leitelt Iron Works.

Further insulation requirements are usually satisfied by the application of 2″ or 3″ corkboard, three or more thicknesses of fiberboard or similar insulating material. One of these kiln roofs had its 6″ reinforced concrete roof slab covered with a 6″ blanket of rock wool before topping was applied.

## KILN DOORS

Most of the early dry kilns were equipped with heavy, hinged doors but these doors quickly deteriorated and were extremely difficult to operate and maintain. While hinged kiln doors are still used, they have been found to be more suited to progressive than compartment kilns.

Wooden door lintels were also used but were a source of constant trouble due to warp and decay. They have been replaced in modern dry kilns by steel channel lintels that are strong and rigid and minimize leakage by the smooth, tight joint produced at the top of the doors. Substantial, sturdy lintels are important to the dry kiln as kiln doors hang from them and they also mount the door carrier overhead track. Wooden door jambs have also been replaced by steel angles in many modern kilns.

An efficient kiln door must be strong and yet light weight; have good resistance to heat loss, moisture and corrosion; be easy to handle; have high insulation properties and low U value; and in some localities, the door must be fireproof. Common kiln door construction materials are canvas, wood, plywood, steel sheets and structural shapes, aluminum sheets and extruded shapes, asbestos board and fiberboard.

Continual trouble with early hinged wooden kiln doors led to the development of canvas curtain doors, many of which are seen in operation today. These curtains were usually constructed of two layers of heavy canvas (10 oz.), which was sometimes treated to improve barrier properties. Wooden strips (about 1″x3″) cut to approximate width of the door, were placed between the canvas layers, spaced about 2″ apart, and were sewn in position before sewing the canvas around the sides. These strips lapped into jambs on each side of the door opening to

*Interior of prefabricated high temperature superheated vapor dry kiln, showing sections bolted together to produce tight joints.*

Courtesy Bachrich Patents Ltd.

make it rigid to withstand pressure exerted against the curtain.

The curtain was fastened permanently at the top to the lintel above the door and a pocket was provided at the bottom into which an iron pipe or wooden roller (2½″ to 3″ diameter) was inserted and sewn in. A rope was attached to the lintel at either side of the curtain, which was run once or twice around the pipe or roller and then up through a pulley at the top to allow the curtain to be rolled up or down. Wooden clamps with spring tension were provided at either side to seal the sides of the curtain to the kiln door opening.

Although reasonably satisfactory results were obtained when curtain edges were properly clamped and canvas was treated with moisture retardant and preservative materials to prolong its life, the canvas curtain door had many obvious disadvantages. Insulation was improved by the use of two curtains, providing an air space in between, but each curtain had to be operated separately. Despite this improvement and protective treatments, the curtain doors decayed quickly, were easily torn, contributed to excessive kiln leakage, were difficult to handle and maintain, and never effectively sealed in the heat nor kept out the outside air to permit uniform drying conditions to prevail within the kiln.

Development of wooden kiln doors has progressed from the heavy, cumbersome hinged doors to lightweight sliding doors, operated with a convenient carrier. Good wooden doors are now built up of cypress, redwood or hard pine, or other species properly treated with preservative and fire retardant materials. Many of these doors are of wood slat construction, with insulation sandwiched in between the open woodwork. Roofing felt and canvas treated with kiln paint are also used in some door constructions.

A typical wooden kiln door construction uses ¾″ slats built into a frame, covered with a vapor barrier (asphaltum paper, treated canvas, aluminum foil, etc.), over which are placed ½″ x 3″ wooden slats arranged vertically about ¼″ apart and mortised into the door frame. A 1″ air space is provided

and two thicknesses of wood are used in addition to the vapor barrier for insulation. Both sides of the door are painted with asphaltum or other good kiln paint.

Some wooden slat doors are also built into a steel frame and are covered with aluminum sheet or insulating board. The steel frame is usually welded and braced to prevent sagging or pulling out of place. Most of these doors are relatively heavy and require clamping devices to make them tight. The use of kiln paint or similar protective coating is required to prevent the absorption of moisture and protect against attack by acid vapors. Insulation materials commonly used for kiln doors include: cork-board, fiberboard, celotex, asbestos board.

Improved wooden kiln doors have been made of plywood, properly treated to provide maximum resistance properties. Typical of doors of this type is a door made up of ¼″ marine plywood fastened to both sides of a treated wood frame. The space between the two inside surfaces of the plywood is filled with Fiberglas wool insulation. Doors of this type are often equipped with rubber gasket seals to make them completely air tight.

Modern commercial dry kiln doors are lightweight, seal-tight construction for complete protection of the kiln. They are usually made of metal frame construction with well insulated faces that are highly resistant to moisture and corrosive action of acid vapors. Sheet metal doors have failed in the past because of corrosion of acid vapors and had relatively low insulation value unless properly insulated and treated with a protective paint coating. Zinc chromate and aluminum paint have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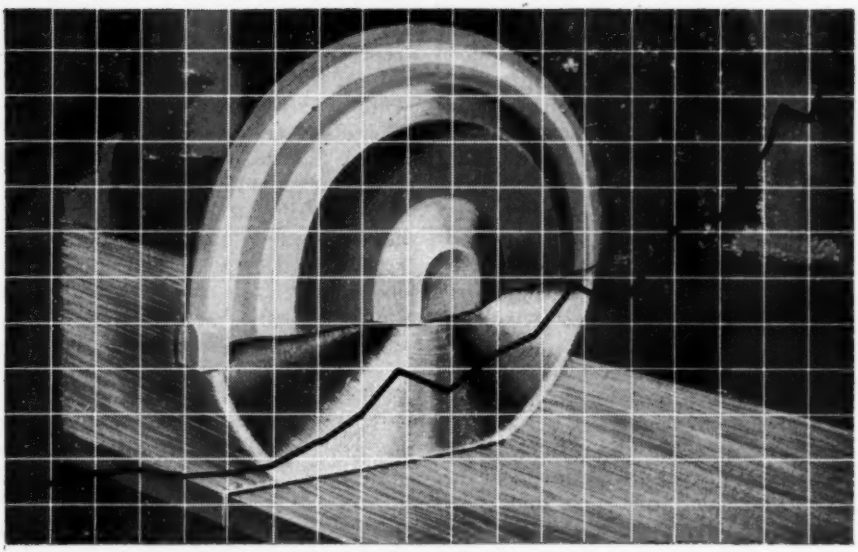

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been used in this application. Aluminum appears to be the most popular commercial door material used today.

Typical door constructions of the two most common types are built up with: 1) sheet aluminum, insulation, aluminum sheet and angle frame electrically welded, and 2) sheet steel, asphalt coating, asbestos, heavy waterproofing envelope and sheet steel. Many of these doors are of the insulated refrigerator type, well gasketed to make a tight seal when closed.

Small inspection doors are usually provided for the operator, in either the kiln door or in the end of the kiln, to allow free access to kiln samples without having to cool off the inside of the kiln by opening the large kiln door. Inspection windows are usually required, where it is necessary to observe wet-and-dry-bulb thermometers, but are not required in dry kilns using recorder-controllers.

Most modern kiln doors are moved with a carrier on patented hangers. The doors are opened and closed by a door carrier running on overhead track above the kiln door opening. The carrier is run into position in front of the door and to open it, hooks are inserted into the door sockets and a lever on the carrier is manipulated to lift the door up and out from the building to allow it to be run out of the way.

## PREFABRICATED KILNS

There is a current trend of popularity toward prefabricated dry kilns which are flexible as to size, and permit easy erection of the kiln. Wall and roof panels are completely constructed and the steel work is usually cut, welded and drilled for assembly to close toler-


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ances. The panels may be steel framed to support aluminum sheathing, or they may be aluminum lined on the inside and steel clad on the outside, in standard sizes of 4′x12′. In either case, the panels are built as a complete envelope filled with insulation to be moisture and vapor proof. Air space is usually provided between panels and structure.

The building units are completely prefabricated and generally require only the foundation and floor to be prepared before assembly, incorporating ducts, plate studs and tracks cast in the poured slab. Sections are bolted together to produce tight joints, often with aluminum bolts used throughout so that aluminum does not touch steel.

Aluminum and steel prefab buildings for high temperature kilns are usually made with extra heavy insulation. A popular high temperature kiln in Europe has aluminum lining, insulated with about 5″ of Fiberglas wool covered with a steel sheet. Conventional kiln insulation seldom exceeds a thickness of 3″. All kiln construction is welded to be vapor tight. Doors are generally of heavy construction fitted with extra deep wedges or screw-down handles to afford tight fit into specially constructed and cushion frame to make a tight seal.

Many interesting claims are made for these prefab kiln buildings. As specified by one prefabricated kiln manufacturer: "Side walls are equivalent to 27″ of common brick; roof panels to over 41″ of brick in insulation values. Permits saving of 50% of steam normally lost through masonry walls. No painting or plastering of walls required. No sweating with 85% relative humidity inside kiln and 0 degrees temperature outside kiln."


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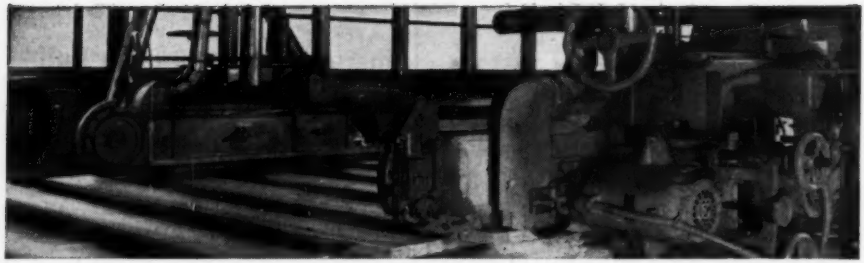

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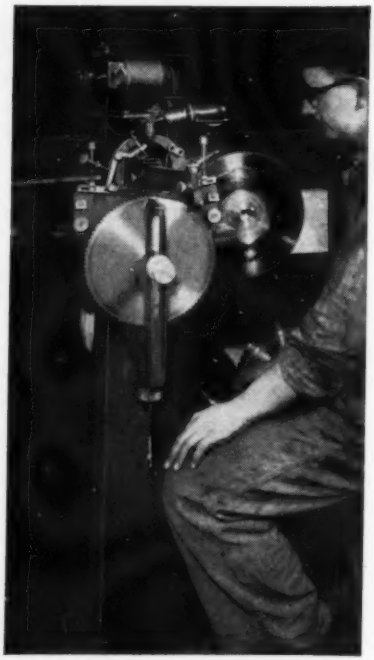

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# RESEARCH PROJECT in the Southeast Area

*By Howard J. Doyle, Council Forester, Furniture, Plywood and Veneer Council, The North Carolina Forestry Association, Hickory, N.C.*

UNIQUE in the history of forestry is the Hardwood Research Project sponsored by the Furniture, Plywood and Veneer Council of the North Carolina Forestry Association, the Southeastern Forest Experiment Station and the Duke Power Company. For the first time an industry, the Federal government and a private utility company are cooperating to solve a mutual forestry problem.

For years researchers in the South have concentrated on the management of pine with relatively little attention being given the hardwoods, except as possibly how to control them in present or prospective pine stands. However, the picture is changing today and hardwoods are coming into their own. As usual markets play a key role in bringing the change.

The concentration of some 300 furniture plants, with their closely allied suppliers of hardwood lumber, plywood and veneer, in North Carolina form the largest center of the wood furniture industry in America, and perhaps, in the world. Until recent years, an adequate supply of good grade hardwood timber has been available locally to supply them with the necessary raw material for manufacturing furniture. This supply has dropped until now only about 44% is furnished by the forests of North Carolina. This naturally means that over one-half the supply must be shipped in from outside the state with resulting higher freight charges.

Although many of the hardwood users have been actively supporting the North Carolina Forestry Association since its beginning, it was not until October 7, 1953 at the request of Roger W. Wolcott, president, and Ralph Edwards, vice-president and leader in the furniture industry, that they banded together within the asso-

*Counting rings on large white oak stump cut on Duke Power Company lands. R. B. Johnston, R. W. Wolcott, and James T. Broyhill are the men shown here.*

*J. C. Liebhart, Ralph Edwards, R. B. Johnston, Herman Hermeliak, and C. F. Korstian.*

ciation to form the Furniture, Plywood and Veneer Council. This group convened at High Point, N.C., to study the hardwood situation, with special emphasis on hardwood research; to acquaint members of the furniture industry with the work of the association; and to bring into closer working relation, through membership in the North Carolina Forestry Association, the branches of forest industries, landowners, and others interested in forestry.

James T. Broyhill, of Lenoir, was named chairman of the membership committee, and J. C. Liebhart, of Drexel, was appointed chairman of the research committee. With the selection of Ralph Edwards, Morganton, as general chairman of the council and the active work of the committees, things really began to move.

Turning to the Southeastern Forest Experiment Station for the help of one full time man and the Duke Power Company, who owns 225,000 acres along the Catawaba River, the council entered into an agreement. The Duke Power Company, through its chief forester, Carl J. Blades, agreed to provide the necessary land for the experiments and the non-technical labor for carrying out the experimental work. Director E. L. Demmon, of the U.S. Forest Service, is to be responsible for the technical research work in forest management and utilization by assigning a full time forester to the project. This man will be under the direct supervision of Dr. L. J. Metz, Piedmont Research Center at Union, S.C. David F. Olson, Jr., formerly of Lake City, Fla., has accepted this assignment. The council of the association has furnished the services of one technical forester, Howard J. Doyle, for at least half time to assist in the conduct of the research. The other half of Doyle's time will be spent in an educational and public relation program for the association designed to bring the findings of the research work to the attention of the industry and the landowners as soon as possible. Formerly area forester with the Southern Pulpwood Conservation Association, Doyle began work as council forester on March 1, 1955.

Beginning with a study of soil site relations to determine which soils are

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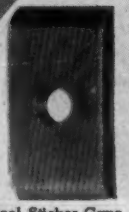
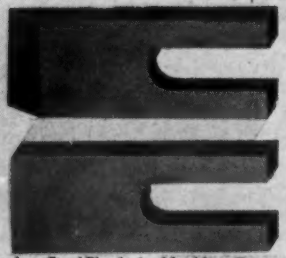
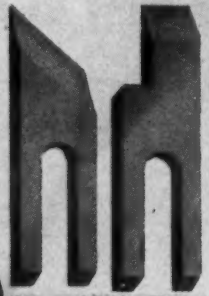
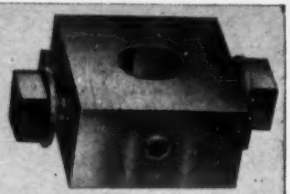

Steel Sticker Caps


Carbon Steel Blanks for Moulding Knives


Mitre and Rabbet Blanks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Shuff Sticker Saw Head for Use on Moulders

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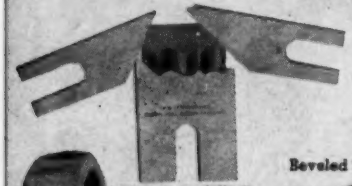

Moulding Knives

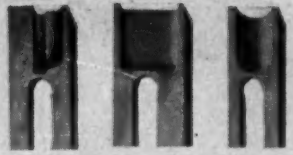
Beveled Edge Shaper Knives

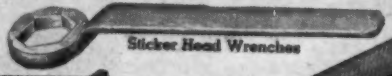
Micrometer Knife Setting Gauge

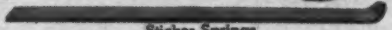
High Speed Shaper Steel

Palm Screw

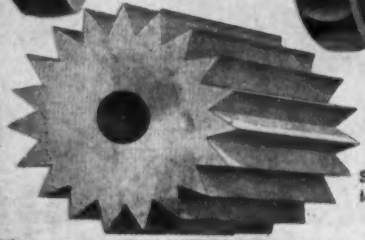
Palm Nut


Milled Knives


Sticker Head Wrenches


Sticker Springs

Sticker Posts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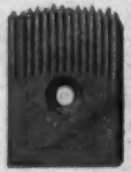
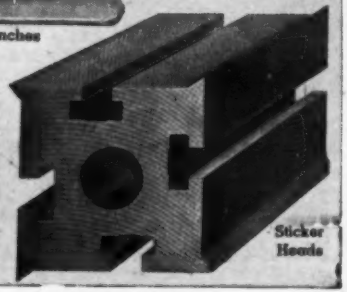
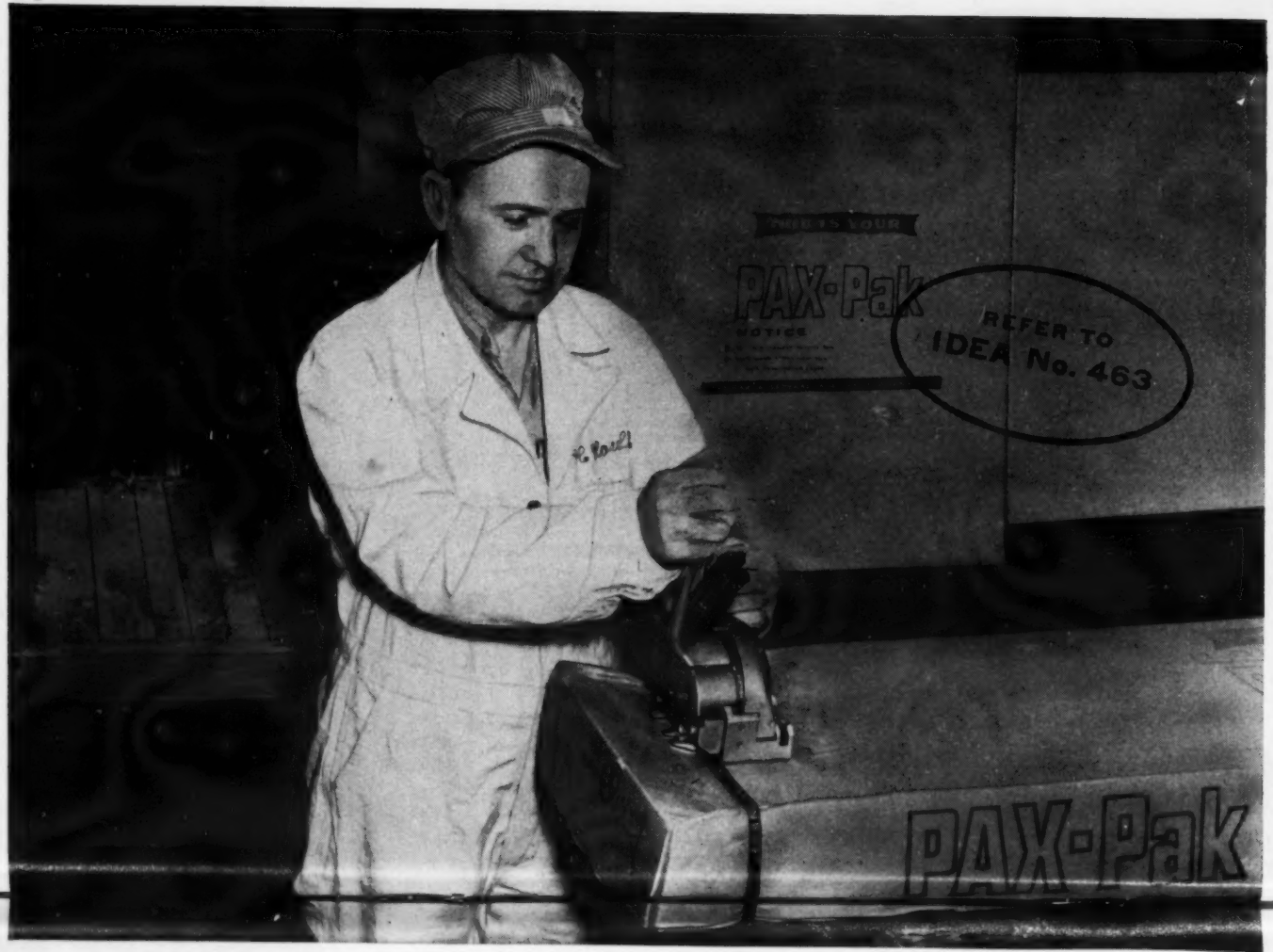

Spurs


Sticker Heads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better suited for the different species, the work will progress through the artificial establishment of various hardwoods, to farm woodlot and compartment studies of harvest cuttings in the upland hardwood type. To study the effect of species composition on hydrologic properties of the soil such as infiltration, water storage, etc., and to test the effect of changing soil properties on tree growth, work will be done to determine the effect of stand composition on soil improvement.

All commercial species within the Piedmont will be studied, including pine. However, since 38% (by far, the largest single species) of the lumber consumed by the furniture industry is yellow poplar some emphasis will be placed on this species.

The farm woodlot studies, while acting as a pilot plant for testing the various management practices, will also serve as demonstration areas where interested parties may see for themselves the results of the different practices.

The over-all direction of policy for the project is in the hands of a steering committee. This committee is composed of Dr. Richard J. Preston, chairman, N.C. State College, School of Forestry, Raleigh; Dr. C. F. Korstian, co-chairman, Duke University, School of Forestry, Durham; Ralph Edwards, Henredon Furniture Industries, Inc., Morganton; Mr. James T. Broyhill, Broyhill Furniture Factories, Lenoir; Mr. H. M. Hermelink, Duke Power Company, Charlotte; Mr. Clarence Holden, Broyhill Furniture Factories, Lenoir; Mr. R. B. Johnston, American Furniture Co., N. Wilkesboro; Mr. J. C. Liebhart, Drexel Furniture Co., Drexel; Mr. R. A. McCuiston, Thomasville Chair Co., Thomasville; Mr. Walton R. Smith and Dr. E. L. Demmon, Southeastern Forest Experiment Station, Asheville; and Mr. Roger W. Wolcott, president, N.C. Forestry Association.

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• Drills up to 8 Holes at 1 Stroke • Fits Any Drill Press
• Adjustable to Any Hole Pattern
• Quickly Pays for Itself Many Times Over

● Commander MULTI-DRILLS are instantly and easily adjusted to handle any hole pattern within a 9" circle. Standard Extension Spindles will increase working area to 22½". Minimum center distances close as ½". Compact in design, ruggedly built, Commander MULTI-DRILLS are making BIG Savings in time and labor for wood-working plants everywhere. Special adaptations available.

See us at Booth No. 502 Metalworking Machinery & Equipment Exposition, Chicago Coliseum, Sept. 6-17.

*Commander* MFG. CO. 4222 W. KINZIE STREET CHICAGO 24, ILLINOIS

---

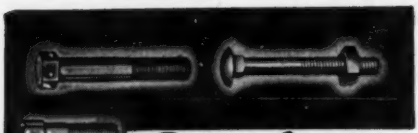
# 5 BASIC UNITS IN 1 PLURALITY

## OILSTONE GRINDERS

With one Mummert-Dixon Plurality Oilstone Grinder you get (1) Coarse Oilstone Wheel, (2) Fine Oilstone Wheel, (3) Grinding Cone, (4) Leather Stropping Wheel and (5) General Grinding Wheel. Made in 3 sizes to meet every grinding and sharpening requirement in woodworking plants. Designed for hard and long usage. Efficient. Easily accessible. Investigate Mummert-Dixon equipment now. Send for informative literature today. No obligation.

## MUMMERT-DIXON CO.

124 Philadelphia St., Hanover, Pennsylvania



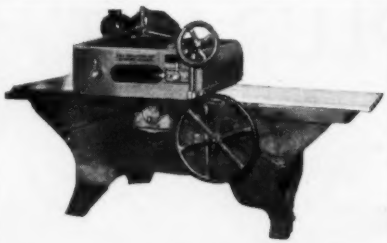
**Reduce Costs** by assembling your products easier and stronger with "Rockford" Quality Controlled Threaded Fasteners.

We manufacture a complete line.
- Cap and Set Screws
- Socket Head Cap and Socket Set Screws
- Studs
- Machine Screws and Stove Bolts
- Nuts — Square & Hexagon
- Wood Screws and Drive Screws
- Sheet Metal Screws
- Carriage Bolts
- Specials
- Aircraft Screws & Bolts
- Made in Slotted or "Rockford-Phillips" Heads

"Quality Controlled" Products.

"ROCKFORD" Screw Products Co.
2501 S. Ninth Street
ROCKFORD, ILLINOIS
Phone: 4-9441 or Teletype: RK 88

"I didn't know neatness counted."



**BILLSTROM POWER FEEDER**

FACES CROOKED STOCK STRAIGHTER THAN ANY OTHER FACER.

*ASK US ABOUT IT*

**NELS J. BILLSTROM, INC.**
**ROCKFORD, ILL.**

**Nutting**

**Most Complete Line of Floor Trucks in America**

**Figure 321**—Lumber Buggy. Large wide tread wheels for outdoor as well as indoor use.

**Figure A** —Balance style for turning sharp corners. Variety of superstructures and wheel sizes.

**Figure 1191**—Timber Dolly. Used as a dolly or, inverted as a portable roller.

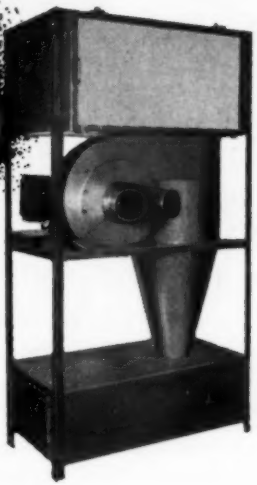
**Figure 2419 and 421**—Jacks and Skids. Stores and transports materials with one-time handling. One Jack services many Skids.

*WRITE FOR FREE LITERATURE*

SINCE 1891 NUTTING TRUCK & CASTER CO.
1129 Division St. • Faribault, Minnesota

# EFFICIENT–LOW COST

# Dust Collection



Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

DUSTKOP® STOPS DUST

37 STANDARD MODELS TO CHOOSE FROM

• READY TO USE

## Also a Complete Line of Mist Collectors

**AGET** MANUFACTURING COMPANY

1392 E. CHURCH ST. • ADRIAN, MICHIGAN


## NEW LITERATURE

Synvar Corporation, Wilmington 99, Delaware, has released a pamphlet describing their Synvaren "PLS" resins.

The pamphlet describes the application of their resorcinol-phenol-formaldehyde resins, Synvaren PLS-AA, Synvaren PLS-A, Synvaren PLS-1 and Synvaren PLS-2, in the woodworking industry.

### WHELAND BULLETINS

A new bulletin is available from the Wheland Company, Signal Mountain Rd., Chattanooga, Tenn. Bulletin LHJ-2 gives complete mechanical specifications on Wheland log haul-ups, log jackers, wing tooth sprockets, log dogs, foot wheels and idlers. The 8-page booklet is well illustrated, includes tables of specifications and complete descriptions of the equipment offered by this firm.

HE WOULDN'T THINK OF
USING ANYTHING BUT A

Chicago SAW

You too will recognize the superiority of Chicago circular saws once you've tried them. They're stocked in all popular sizes and types. Special sizes to meet specifications.

**FREE** Write for catalog illustrating and describing the complete line of Chicago Saws.

Chicago Saws INC.
CHICAGO SAWS, INC.
6134 Oak Park Ave. • Chicago 38, Ill.
Telephone LUdlow 5-2121

**OFFERS INFORMATION FILE**

A new 4-color information file is now available from Fabricon Products, manufacturers of Lamin-Art high pressure plastic laminates.

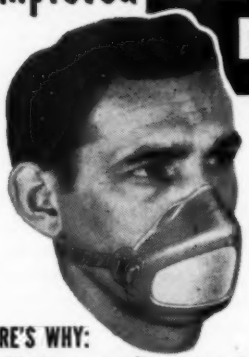
Featuring all colors in the new Catalina and Coronado patterns, this new file unit includes an actual sample of the new contemporary Catalina pattern. Complete information on sizes, colors, specifications and availability of Lamin-Art in both standard and full form covering stock is provided on the file unit, which is specially designed for incorporation into the standard permanent files of the architect and decorator.

For a copy of the new file unit write: Fabricon Products, Whittier, California.

**STRAPPING MACHINES**

Signode Steel Strapping Company, 2600 N. Western Ave., Chicago, Illinois, has just released a four-page folder

THE Improved **FLEX-A-FOAM DUST MASK**



Your best ounce of protection against

**IRRITATING DUST**

HERE'S WHY:

★ **Workers wear it** Lightweight (just 1 ounce), snug, comfortable and easy-to-breathe through, Flex-a-Foam is the *one* respirator your workers actually *welcome*.

★ **It's super-efficient** Flex-a-Foam's pure latex filter protects against nuisance dust particles 100 times smaller than the eye can see!

★ **It's simple** Only four sturdy, long-wearing parts — all interlocking — all *unconditionally* guaranteed.

★ **And—it's economical** *Low first cost* — less than any other *quality* respirator on the market. *Low upkeep* — washable filter outlasts throwaway type by more than 100 to 1!

**Dust Protection Your Workers Will Welcome and *Wear***

SAMPLE STILL ONLY $1.40 POSTPAID (INDUSTRIAL PRICE ONLY)

FLEX-A-FOAM® DUST MASK

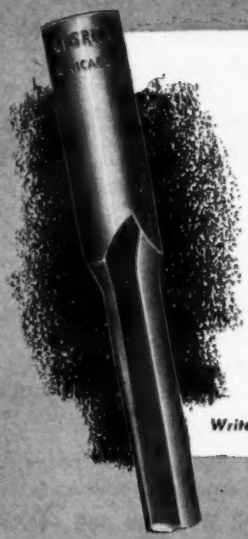
FLEXO PRODUCTS, INC., CLEVELAND 13, OHIO

on the Signode power strapping machines. Numerous photos illustrate up-to-date automatic steel strapping of cartons, boxes and bundles. The folder also shows how companies throughout industry have adopted this entirely new concept of production line packaging methods. See how the flooring industry is applying up to 1,000 straps per man per hour . . . and many more examples of time and money savings.

**TWO STARRETT CATALOGS**

Bulletin No. 416, 80-page, 8½ x 11 catalog describes and illustrates the Starrett line of dial indicators, dial gages and instruments. Includes 140 models of the new high precision-low friction dial indicators, "Last Word" dial test indicators, new magnetic base dial indicator holders, dial comparators and bench gages, dial depth gages, hand and pocket dial gages, dial sheet gages,

# CUTTING PERFORMANCE
## 2 to 3 TIMES GREATER



The Special alloy high speed steel in Onsrud bits makes possible a finer, more serviceable cutter for smoothest work. The bits are carefully ground to correct clearance, tempered in modern controlled atmosphere electric furnaces, to insure uniformity and accuracy. These bits can usually be relied upon to give from 2 to 3 times the cutting performance of most ordinary routing bits because of their high tensile and transversal strength.

*Write for illustrated* **BULLETIN** *and* **PRICES.**

Onsrud Cutter Manufacturing Co.
801-21 E. Broadway,
Libertyville, Ill.


cylinder gages, out-of-roundness gages, inside dial gages, and strain gages, vibrometers, etc.

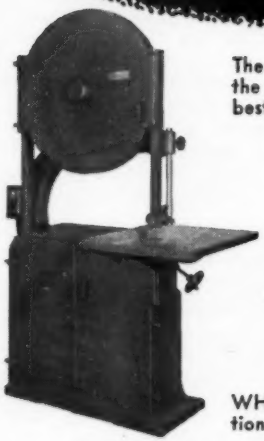
Bulletin No. 1053, 60-page, 8½ x 11 catalog describes and illustrates the complete line of Starrett hacksaws, hole saws, band saws and band knives. Includes descriptions, illustrations, application data and reference tables covering hand and power hacksaw blades, hacksaw frames, hole saws, screw slotting saws, metal cutting band saws, wood cutting band saws, meat cutting band saws, dry ice cutting band saws and band knives for cutting soft or fibrous materials.

Bulletins are available from the L. S. Starrett Co., Athol, Mass.

### SCREW CATALOG

In its new 30-page, two-color catalog, Southern Screw Company of Statesville, N.C., manufacturer of screws and bolts, offers an extended range of fasteners including machine screws and A

# CRESCENT
# 36 In. BAND SAW



The Band Saw is the most useful tool in the woodworking shop so why not get the best; one with all of these fine features:

- Massive Construction
- Ball Bearing Guides
- Handwheel Tilt Table
- Counterbalanced Guide Bar
- Balanced Wheels
- 3 or 5 HP Motors
- Up to 24¾" Under Guide
- Models for Cutting Wood—Metal—Plastic Burlap—Paper—Rubber

WHICH—All add up to increased production at lowered operating cost.

***ALSO***—Did you know that the Crescent 36 in. Band Saw even with all its quality is one of the lowest price offered on the market—

## Investigate Now!

WRITE FOR FREE BULLETIN 205 TODAY

Mfrs. of—Circular and Band Sawmills, Power Feed Rip Saws, Multiple Cut Off Saws, Swing Cut Off Saws, Single Surfacers, Jointers and Band Saws.

THE **ENTERPRISE** COMPANY
MACHINERY BUILDERS & ENGINEERS
SUBSIDIARY OF WM. K. STAMETS COMPANY · PITTSBURGH
COLUMBIANA 1, OHIO · U. S. A.


& B tapping screws, Phillips and slotted, and stove bolts, available in steel, brass, silicon bronze, aluminum, and stainless steel.

Southern's complete range of Phillips and slotted wood screws, shipped from stock of over 500 million screws, is listed in Catalog No. WS-1. Inquiries are invited on hanger bolts, carriage bolts, drive screws, dowel screws, and knob screws.

Rust resistant and decorative finishes are nickel plated, which can be furnished dull or bright; brass plated, slightly lighter than solid brass; cadmium plated, an attractive gray; and chromium plated, popular for its lasting polishing quality.

### BAND SAW GUIDES

"Hoco" roller band saw guides are fully described in a 4-page brochure. These guides are used for wood, metal

# SAVE

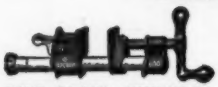
**TIME and PRODUCTION COSTS with HARGRAVE "Load Tested" Clamps**

NO. 640 "I" BAR CLAMP
In 7 sizes with patented quick locking movable jaw.

Steel Spindle Hand Screws in 8 sizes for woodworking.

QUICK CLAMPS
In 61 sizes in 12 different types.

Standard Carriage Clamp No. 540 in 9 sizes for all average applications.



PIPE CLAMP FIXTURES
In 2 sizes. Economical bar type clamp. Fits ½" - ¾" pipe.

ASK YOUR DISTRIBUTOR for a copy of the new Hargrave Catalog with selection-application information.

**THE CINCINNATI TOOL CO.**
1949 Waverly Avenue
Cincinnati 12, Ohio

**HARGRAVE**
*The Complete Line of Tested*
**TOOLS**


or textile band saws and are available in all sizes for blades from ⅛" to 6" wide. Advantages which the manufacturer lists for these guides include: the side blade guide is directly next to the teeth and back of the saw; adjustment can be made for blades from 2¾" to 6"; blade is guided by means of the V-position; no lubrication as all rollers run in self-lubricating bearings; and the guide is usable for upper and bottom positions.

Copies of the folder are available from Werner Maag, U. S. Office Woodworking Machinery, 2011 Rosemont Ave., N.W., Washington, D.C.

## BALSA BOOKLET

The International Balsa Corp., 96 Boy Ave., Jersey City, N.J. is offering a 4-page brochure on balsa. This literature describes the material and suggests applications of it in life saving equipment, sports, model kits and "do-it-yourself" materials as well as many other utilizations.

## MORTISING TOOLS

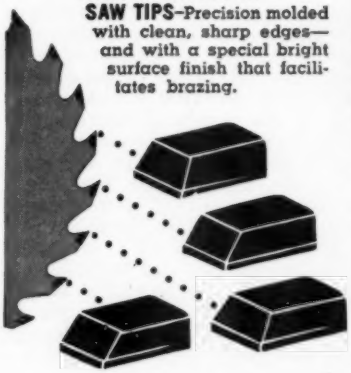
The Forest City Bit & Tool Company, Rockford, Ill., has issued a very fine catalog on mortising and boring tools, Catalog No. 65. The 16-page catalog describes and illustrates the complete line of tools offered by this firm. Each type of tool is shown and best utilizations suggested.

## INCREASE SAWING PRODUCTION

A manual issued by the Foley Manufacturing Co., Minneapolis 18, Minn., suggests that efficient use of automatic saw sharpening equipment may increase sawing production 25%. The manual contains letters of recommendation from users; lists of firms using Foley saw sharpening equipment and an excellent section on the use of the equipment.

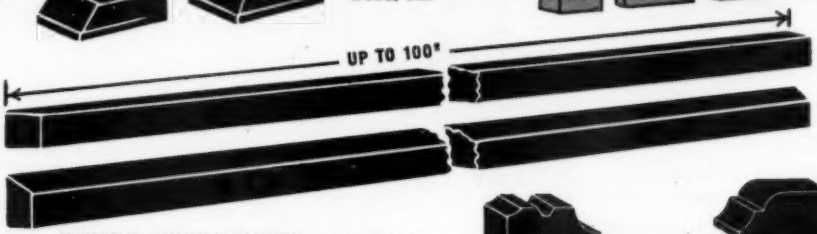
Photographs and diagrams show Foley saw sharpening equipment in detail. The manual gives general instructions for filing many types of saws—illustrations are generously used throughout.

**TALIDE CIRCULAR SAW TIPS**–Precision molded with clean, sharp edges—and with a special bright surface finish that facilitates brazing.

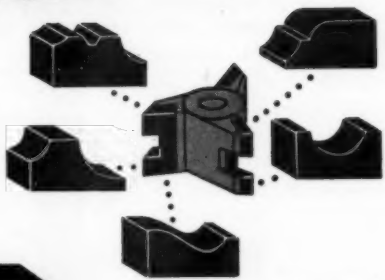


**TALIDE TIPS**
*stay sharper · cut longer · lower costs*

Available in 5 standard grades and in many sizes and shapes, for high production service on every type of woodworking operation, including the cutting of insulation board, hard board, fibres, plastics, laminated wood, etc.




**TALIDE KNIFE INSERTS**–Made in one solid piece (without seams or sections) and in any length up to 100"—a Talide insert assures top performance on all planer knife applications.



Metal Carbides Corporation, Youngstown 7, Ohio.

*Send for Catalog 54-G*

METAL CARBIDES CORPORATION
MC
TALIDE
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 35 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

**TALIDE ROTARY CUTTER BLANKS**
Preformed to accurate tolerance with minimum stock—and to any form or shape desired.

## FLEXIBLE HOSE

The Flexaust Company, 100 Park Ave., New York 17, N.Y., has available five new bulletins—No. 40, 41, 42, 43 and 44. The bulletins are of interest to anyone concerned with the design, installation or purchase of flexible hose used in dust and fume control, air conditioning and materials handling. They contain general information, accessories, installation, application, friction loss and other useful data.

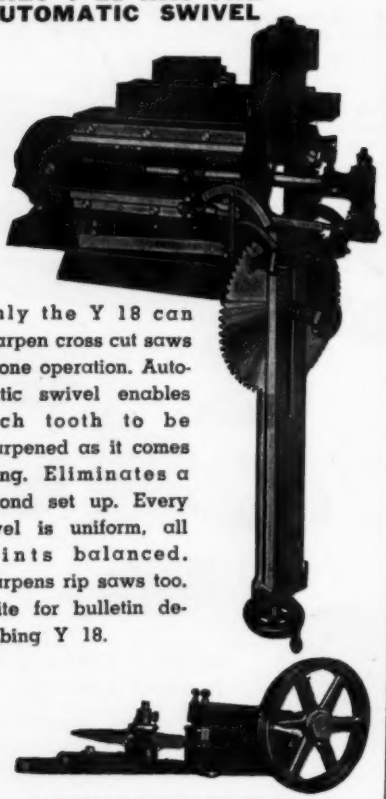
## COST ACCOUNTING MANUAL

Under the leadership of the Southern Furniture Manufacturers' Association, cost accounting problems in the southern furniture industry are being attacked on a broad front, through the issuance of a "Cost Accounting Manual" compiled in collaboration with one of the outstanding auditing firms of the country.

The new Manual, according to the Association, is not intended as a stand-

# Sharpens, bevels each tooth as it comes along

**ONLY Y 18 HAS THE AUTOMATIC SWIVEL**



Only the Y 18 can sharpen cross cut saws in one operation. Automatic swivel enables each tooth to be sharpened as it comes along. Eliminates a second set up. Every bevel is uniform, all points balanced. Sharpens rip saws too. Write for bulletin describing Y 18.



**AC 38 CIRCULAR SAW SETTER**

Sets teeth at a speed of 150 to 200 per minute on saws with diameters from 5" to 38".

**WARDWELL**

**MANUFACTURING CO.**
3806 Ridge Rd.
Cleveland 9, Ohio

Maker of largest line of saw filing machines.


ardized system but is a guide to and explanation of the best current methods and practices in furniture cost accounting, the principles of which may be followed in revising unsatisfactory methods or in working out a system tailored to the needs of a particular company. In view of such diverse factors as types of products manufactured, volume of production, mechanical equipment, processes of manufacture, personnel, and facilities available for doing cost accounting, the Association states that a uniform, standardized system for the entire industry is not practicable and that a system for an individual company must be devised to meet the needs and desires of top management.

The general principles of cost accounting are fully outlined with detailed information as to job order cost accounting and standard cost accounting, the two methods now most adaptable to the industry. The manual gives complete information as to journal entries, budgeting, estimating cost, inventorying, etc., together with suggested forms for recording and summarizing cost data.

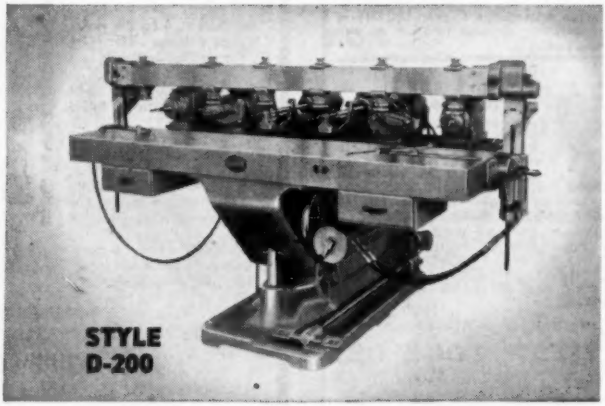
## PLASTICS

A new color catalog showing actual design samples of Decarlite plastic laminates is now being offered by Decar Plastic Corporation, 1212 N. Central Park Avenue, Chicago, Ill., to manufacturers of kitchen cabinets, dinettes, desks, tables and plastic surfaced case goods. The new catalog shows reproductions of the company's Decarlite line and contains sample plastic sheets to show actual colors and the new designs.

## AIR COMPRESSORS

This booklet, issued by Sar Co., Inc., Empire State Bldg., New York 1, N.Y., contains extensive information on air compressor equipment. There are excellent charts, graphs and photographs. The bulletin is intended to help users of compressed air to improve the effective capacity of their installations.

## DIVERSIFIED MACHINE FOR PRODUCTION WOOD BORING




All types of edge, end and face boring in wood assembly parts are accomplished with a high degree of accuracy over long runs. Root's Model D-200 can provide the answers to all types of dowel and screw hole boring. Hydraulic spindle feed, geared-head individually motorized spindles, and automatic adjustable work clamps are a few of the features of this widely used machine. Write for bulletin.

**B. M. ROOT CO.**
YORK, PENNSYLVANIA, U. S. A.


### FORESTRY HANDBOOK

An impressive array of specialists in forestry, conservation, wildlife management, soil conservation, range management, lumber and paper industries, have contributed to the "Forest Handbook" announced for publication Sept. 1, by the Ronald Press Company, New York.

This handbook, unique in its comprehensive coverage of its field, has been prepared under the direction of the Society of American Foresters. Virtually the entire literature of forestry and its related fields has been drawn upon in gathering the diversified subject matter of the volume, which was eight years in preparation.

The "Forestry Handbook" is a volume of 1,212 pages and 23 profusely illustrated sections. The comprehensive material on forest management and silviculture includes all of the basic tables, converting factors and related data commonly used by foresters in the United States and Canada.

## NEW TITAN High Speed Hanger Bolt Driver

• TIMED IN SECONDS!

This tool is used by a majority of plants where hanger bolt driving is done on a high production basis. Can be operated at any speed which is safe for driving the hanger bolt. It is not necessary to stop rotation at any time.

**NEW COLLAPSIBLE TYPE TRIP GAGE**

Patented. Has such a large adjustment range, made possible by a new all-thread main ring, that most common stud projection heights can be secured with only one gage.

- AUTOMATIC TAKE-UP FOR WEAR ON JAWS
- REVERSING POSITION OF CLUTCH GIVES DOUBLE WEAR AT HALF COST
- AFFORDS ACCURATE PROJECTION HEIGHTS
- USE WITH ANY AIR OR ELECTRIC DRILL OR DRILL PRESS

Write for Free Literature, Today!

TITAN TOOLS

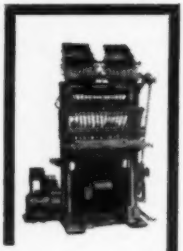
**TITAN TOOL CO.**

*Production Tools*

49 Main St.,

FAIRVIEW (Erie County), PA.

## SUPREME nailing machines *for lower cost nailing*



- ★ Drives 4 to 30 nails at a time - straight rows or zigzag
- ★ Adjustable for different gauge nails
- ★ Easily raised or lowered tables
- ★ Nail combinations to meet your requirements.

*Available in 4, 6 and 8-track closed back models and open back models with up to 100" between uprights.*

WRITE FOR ILLUSTRATED LITERATURE

**SUPREME WOODWORKING MACHINERY CORP.**

50-52 Howard St. New York 13, N.Y.

## It's The Performance You Get From Wysong Dovetail Bits That's Most IMPORTANT!

A long life of accurate, clean cuts is what you get with *Wysong Dovetail Bits!* Precision made from carbon or high-speed steel, and individually hand finished. They are economical to buy and continue to save you money by standing up under continuous hard use.

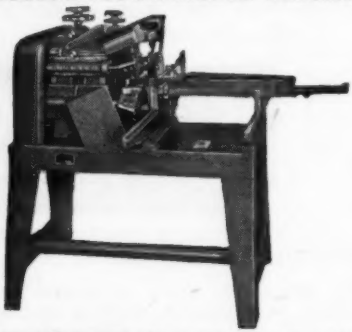
**WYSONG**

DOVETAILERS • MORTISERS • SANDERS

**WYSONG and MILES COMPANY**

Dept. DB, Greensboro, N. C.

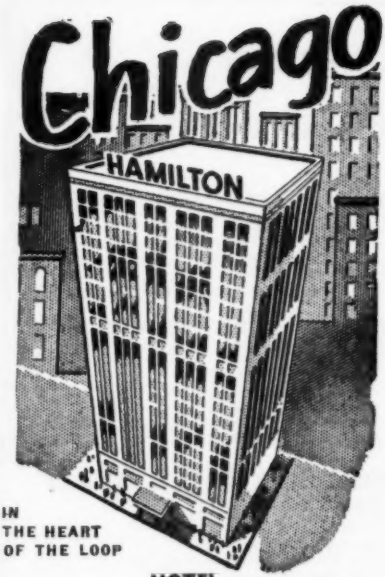
## HARRIS DELUXE FLOOR MODEL TENONER



**New adjustment** allows exact and simultaneous adjustment of tenon spindles.
**3 H.P. Motor**
**3 Inch Blades**
**V Belt** pulley drive on both tenon and cope spindles.
**Heavier Construction** for greater accuracy.

**MILLBURY MACHINE COMPANY**

**13 WATERS STREET, MILLBURY, MASS.**




IN
THE HEART
OF THE LOOP

HOTEL

# HAMILTON

**20 S. DEARBORN ST. at MADISON**

**CHECK THESE FEATURES**

- √ VERY LOW RATES
- √ CLEAN COMFORTABLE MODERN ROOMS
- √ A FAMILY HOTEL COME AS YOU ARE
- √ ONE BLOCK FROM STATE ST. SHOPPING
- √ A FEW BLOCKS FROM ALL ENTERTAINMENT
- √ 3 MINUTES FROM THE FINANCIAL DISTRICT
- √ FREE RADIO-TV AND AIR CONDITIONING AVAILABLE
- √ PARKING JUST A FEW BLOCKS FROM HOTEL 60¢ OVERNITE
- √ CRIBS FOR THE BABIES—COTS FOR THE CHILDREN

**ALL THIS**

**FROM $4 SINGLE AND UP**

**INFORMATION — RESERVATIONS — WRITE**

**SAM LEEDS, Mng. Dir.**
**Box 100**

Hotel HAMILTON

FIELD
SINCE 1886

**ROUTER BIT GRINDER**
**FOR**

**SHARPENING**

- **ROUTER BITS**
- **DOVETAIL BITS**
- **3 LIP CUTTERS**

**and Many Other Cutting Tools Including Carbide Cutters**

The primary purpose of this motorized, positive indexing Router Bit Grinder is to eliminate freehand grinding on hundreds of small cutting tools. The machine sharpens high speed and carbide cutters on an entirely mechanical basis, with extreme precision, saving cutter life and improving quality and quantity of production. Write for circular.

**Send Sample Bit to us for Free Sharpening**

*Manufactured by*

**WILLIAM H. FIELD CO.**
**327 Dorchester Ave.**
**Boston 27, Mass.**

# DISTRICT MANAGERS

# WOOD WORKING DIGEST

### EASTERN DIVISION

Dan E. Reardon, V.P.
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528

### NEW ENGLAND, EASTERN N. Y. STATE

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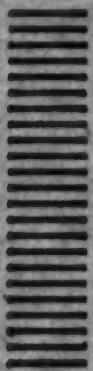

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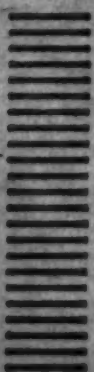

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# FINISHING SECTION

Furniture Finishing

Paint Heating Pays

# FURNITURE FINISHING

**Part 6**

By

**HAROLD B. GATSLICK**

A STAIN may be defined as a suspension or solution of coloring matter which is designed primarily to impart surface color effects. The principal reasons for staining would include:

1. Increasing or accentuating the color contrast of highly figured woods.
2. Uniforming the color contrast by reducing the color difference between heartwood and sapwood.
3. Producing color harmony not obtainable with natural-finished woods.
4. Imitating more expensive woods with species having less desirable shades or tones.
5. Producing special effects such as weathered oak, antique pine and cherry.

## WOOD STAINS

Wood stains may be separated into four major types. These are: water soluble, oil soluble, spirit soluble and non-grain-raising. Sometimes classified as primary stains, these stains have as their major volatile component a liquid containing the hydroxyl group. A comparative table of the advantages and disadvantages of the important wood stains is shown in Table 1.

**1. Water stains**—Water stains are normally one to three percent solutions of acid, acid-mordant, basic, direct or develop dyes in water. Wetting agents, rosin size or water-soluble binders are incorporated to improve penetration, uniformity and to allow for maximum adhesion of topcoats. Lauco vat dyes are occasionally used to obtain fast staining time, but residual chemicals must be removed before proceeding to the next finishing step. Acid dyes, the most light fast, are generally used for high quality finishes, whereas the basic dyes are employed on short-lived objects where the brilliant hues obtainable add immediate sales appeal.

Only water stains can be brushed without allowing objectionable non-uniformity. The natural affinity between water and cellulose allows for the maximum penetration of water-soluble dyes which often results in a greater depth of finish. Methanol is sometimes substituted for a portion of the water to decrease surface tension, lessen fiber swelling and increase the drying rate. However, if five percent water is present, grain-raising effects are quite definite as contrasted to those of a non-grain-raising stain.

Water stains may contain non-volatile components which function as sanding agents, drying time reducers, grain-raising inhibitors, film-forming agents or a combination of these. Shel-

lac gum is commonly used as a sanding agent with some film-forming action and sometimes eliminates the use of a washcoat.

Dipping of water stains is not considered advisable because of excessive grain raising and the possibility of reducing the strength of the glue bond. Low pressure spraying with narrow fan patterns yields the best results in applying water stains.

Water stains have been and are of major importance in furniture finishing because they are inexpensive, have good resistance to light, good clarity and are relatively non-bleeding. Their primary disadvantages are the excessive drying time and the grain raising characteristics which require careful re-sanding.

**2. Spirit stains**—Spirit stains are generally one-half percent to twelve percent solutions of alcohol-soluble dyes with or without shellac or spirit-soluble resins incorporated as binders. These stains are the most brilliant of all wood stain types. Spirit stains are, however, the least light fast, very difficult to apply uniformly and, consequently, not used on high-quality furniture. They dry in from 15 minutes to two hours and are used chiefly for refinishing, repair, touch-up and sap staining.

**3. Oil Stains**—There are two primary classifications of oil stains. They are the penetrating oil stains and the non-penetrating oil stains, often called pigment-wiping stains.

**a. Penetrating oil stains**—The penetrating oil stains are generally one to three percent solutions of oil-soluble dyes in aromatic hydrocarbons with five to ten percent resin drying oil or varnish. Benzol, toluol and xylol are the primary solvents used with these stains. Penetrating oil stains provide good brilliance and clarity and cause negligible grain raising. They dry in from one to twenty-four hours. Their primary disadvantages are bleeding, poor light fastness and their lack of uniformity in application. These stains are used only to a limited extent in quality furniture finishing today.

**b. Pigment-wiping stains**—The non-penetrating oil stains or pigment-wiping stains are dispersions of insoluble pigments in dilute varnishes or drying oils. They have very good light fastness, good color permanence and are non-grain raising in character. Pigment wiping stains are limited in use to plain unfigured woods because of the lack of transparency afforded by the translucent pigments employed. They may be applied by spraying, dipping or brushing, and, after partial loss of solvent, are blended out with stain-dampened rags or brushes.

The greatest disadvantage is their lack of uniformity. They require a longer drying period than most non-grain-raising stains because of the incompatibility of the volatiles, the slower evaporation of the volatiles and the non-volatile ingredients such as oils and resins which further retard evaporation. Most pigment-wiping stains contain some dye and, therefore, bleeding is another disadvantage that may be encountered. The presence of dye will also reduce the color permanence.

The use of pigments offers some filling action and more "build" than obtained with non-pigmented stains. These factors, together with low raw material costs and their adaptability for dipping, make pigment-wiping stains economical for many applications.

Occasionally pigment-wiping stains will be applied over a water or non-grain-raising stain which has been washcoated and sanded. When so employed, the advantages of both the primary stain and the pigment stain are obtained with few, if any of the disadvantages. The filling and covering action of the pigment stain, as well as the uniformity, brilliance and color permanence of the water or non-grain-raising stain, are secured. The added expense of the double operation is lessened to a large extent since equivalent build can be obtained with a fewer number of finish coats.

**4. Non-grain-raising stains** — Grain raising has long proved to be one of the more important problems in wood finishing. In the development of non-grain-raising stains, the initial endeavor was to find solvents that would dissolve water dyes, have adequate wood penetration, but not raise the grain. In the ensuing research, it was found that specific gravity, viscosity and surface tension of the solvent affect grain raising. Solvent molecular weight is generally directly related to absorption and diffusion. It was found that physical properties were less effective than chemical properties on the grain-raising problem, since the swelling of the fibers relates directly to the attraction of the solvent to the cellulose crystalloids. Further investigation suggested the use of coagulating agents, shrinking agents, and colloidal coloring systems presenting low osmotic pressure development.

Non-grain-raising stains were introduced in the early 1930's with the first patent being issued in 1932. Most of the patents are owned by the Chadeloid Corporation which licenses stain manufacturers. Non-grain-raising stains consist basically of acid- and/or spirit-soluble dyes in a non-aqueous solvent system. These stains are generally comprised of from one-half to six percent dyestuff, five to ten percent dye solvent, twenty to fifty percent methanol and the remainder of medium-boiling hydrocarbons or other liquids not miscible with water.

Non-grain-raising stains contain no binder to cause complications and residual non-volatiles are generally compatible with subsequent finishing coats. These stains generally contain methanol as a major component with other more powerful dye solvents in minor portions and some coal tar diluent such as toluol to minimize grain raising.

There are two general divisions of non-grain-raising stains. The first consists of only highly volatile liquids, and the second has approximately 90 percent volatiles with the remainder non-volatile solvents.

The first type is used where an extremely fast drying time is desired with minimum grain raising. The second is used where cost, ease of application and color uniformity are the prime requisites. In each division there are an infinite number of modifications possible by variation of ingredients and their percentages.

Binders such as shellac may be used as well as many other additives, including cellulosic materials such as nitrocellulose, various pigmented pastes and resins. Nitrocellulose is used as a film former to give "lay-up" to the stain. Pigments such as burnt sienna or burnt umber used in conjunction with nitrocellulose function not only as a stain but as a uniformer.

Resins are incorporated in non-grain-raising stains to serve as sanding agents and to eliminate the use of a washcoat. Additives, as mentioned above, increase



Table 1. Comparative Table of Advantages and

## Table 1. Comparative Table of Advantages and Disadvantages of Important Wood Stains

| Type of Stain | Advantages | Disadvantages | Application Notes |
|---|---|---|---|
| Water Stain | 1. Excellent light-fastness.<br>2. Uniformly clear, sharp, rich color tone.<br>3. Non-bleeding.<br>4. Low initial cost. | 1. Raises grain of wood.<br>2. Requires washcoating and sanding after staining and sponging and sanding before staining.<br>3. Dries slowly (12 hours).<br>4. Increases over all finishing cost. | Applied by brush, dip or spray methods. |
| Non-grain-raising Stain | 1. Good light-fastness.<br>2. Good color tone.<br>3. Non-bleeding.<br>4. Rapid drying.<br>5. Non-grain-raising, eliminating necessity of shellac washcoat or quick-drying sealer and subsequent sanding.<br>6. Lowers finishing costs by the economies in time, labor and materials it makes possible. | 1. Equals water stains in light-fastness and staining uniformity.<br>2. High initial cost. | Applied mostly by spray gun; widely used in production-finishing installations. |
| Spirit Stain | 1. Extra-quick drying.<br>2. Most brilliant and strong of all dyes. | 1. Least light-fast of all stains.<br>2. Tends to raise grain slightly.<br>3. Has slight tendency to bleed. | Used principally for overtoning or color patching. Applied solely by spray gun. |
| Penetrating Oil Stain | 1. Does not raise grain of wood.<br>2. Comparatively low in cost.<br>3. Good color permanence and brilliance, but not comparable to water stains in these respects.<br>4. Dries rapidly. | 1. Bleeds badly into varnish and lacquer topcoats unless properly sealed.<br>2. Has "rottening" effect on finishing coats if oil content of stain is so great that it impedes drying of the finishing coat. | Applied by dip or spray methods preferably, brushing is difficult. |
| Pigment Wiping Stain | 1. Practically permanent color fastness. | 1. May affect adhesion and drying of topcoat.<br>2. Lacks transparency of other stains, tends to hide or obscure fine detail of wood grain pattern. | Easily applied by spraying, dipping or brushing. Requires supplementary wiping to remove surplus stain. Generally used on plain, unfigured woods to imitate maple, walnut and mahogany colors. Also used for uniforming effect. |

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The dye solvent is generally a mixture of medium-to-high-boiling liquids that are the last to evaporate. The diethyl ether of ethylene glycol, methylactate, ethylene glycol, diethylene glycol and the monomethyl, monoethyl and isopropyl ethers of ethylene glycol and propylene glycol are employed as primary dye solvents. If an excessive amount of primary solvent is used, loss of adhesion and reduced durability of the topcoats may result due to excessive penetration followed by bleeding. The other solvents are diluents but must be formulated to allow fast evaporation without causing moisture condensation.

These stains combine the good features of all the other stains and are brilliant, light resistant, fast drying and non-grain raising. The only disadvantages are their high cost, which is somewhat offset by the elimination of the operations of washcoating and sanding, and the fact that they are not easily adaptable to applications other than spraying.

**5. Specialty stains**—Sap stain is one of the more important specialty wood stains. Sap stains are employed to produce a more uniform color background where marked variation in heartwood and sapwood color is encountered. Since the stains are often brushed, nonbleeding, light-fast water dyes are used with water, alcohol, alcohol-ethers and combinations of these solvents. The increased use of the more volatile solvents decreases the grain-raising problem but makes brushing more difficult and tends to increase the uniforming problem.


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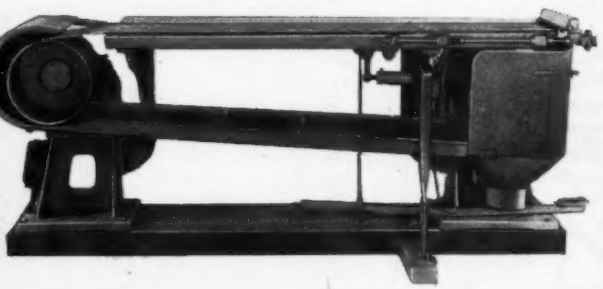

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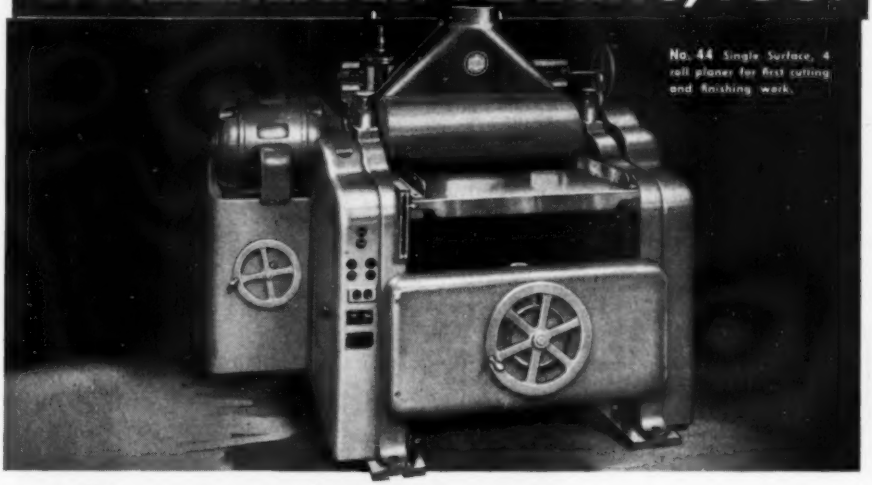

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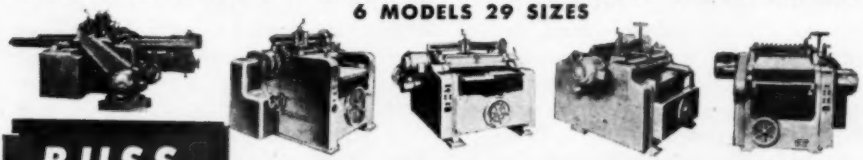

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Another specialty stain material is the so-called equalizer used to make variegated wood more uniform in appearance. Equalizers usually contain opaque pigment and often contain dye to add more brilliance to the finished product. The base material is generally a nitrocellulose lacquer, but may be shellac, shellac substitutes or synthetic resins. For practical purposes, equalizer may be considered the equivalent of a thin pigmented lacquer. Normally they dry extremely fast—five to thirty minutes—sand easily, color only the wood surface, require careful spraying to avoid "mottling," and require periodic agitation to prevent pigment settling.

Considerable progress has been made in developing combination stain-fillers whereby a reasonably deep wood color without a smeared or cloudy appearance can be achieved at the same time that the wood pores are filled. Another combination which has shown good results is the use of non-grain-raising stains with lacquer sealers to produce so-called stain seals. This latter combination is used where sharp definition between color in the wood fiber and the pores is desired.

**6. Chemical stains**—Chemicals, such as ammonia, tannins, permanganates and chromates which affect the formation of color complexes in wood, were widely used prior to the development of synthetic dyes. They are used today only to produce special effects not otherwise obtainable. The application techniques required, their toxicity and the unreliability of their results generally make them economically impractical.

## TONERS

In recent years, with the steady ever-increasing development of modern design, radical departures from the older methods of obtaining color in wood are seen in the use of toners. The difficulties inherent in bleaching processes are probably partially responsible for the increased use of other methods for obtaining unusual color effects.

It has been estimated that 75 percent of modern furniture is finished in light colors. Because of the limited number of light woods and because of the many hazards in bleaching, many manufacturers have turned to pigmented toners made from low-solids, alkyd-type, water-white, lacquer-base materials to which pigments are added.

A toner has been defined as a pigmented lacquer of good opacity and suitable for use under transparent furniture lacquers.

Toners should have just enough hid-

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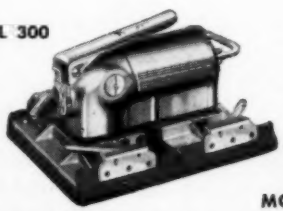

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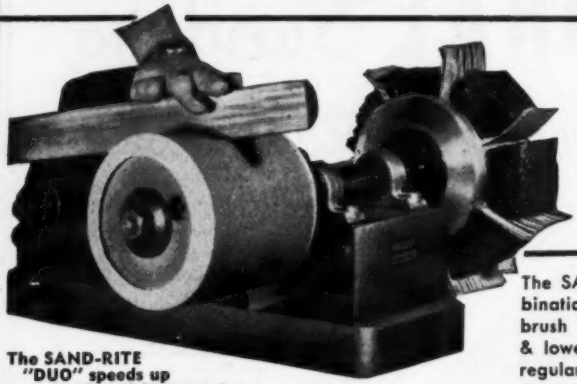

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The SAND-RITE "DUO" is a combination pneumatic drum & rotary brush sander for faster sanding & lower costs on all types of irregular shaped & rounded contour wood products. Eliminate costly hand sanding & maintain top quality finishes by using the "DUO" Sander.

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ing capacity to produce the desired color and equalize the over-all color. If a toner is used employing its full hiding power, both the original color and the identity of the wood species become completely lost and the piece appears painted. By using a filler of contrasting color, the pore and grain pattern can be restored. Toners can be of some help in reducing the problem of light color reduction because it is possible to make pigmented lacquers which have far better fastness to light than most bleached or light-colored woods. This is because pigments employed in nitrocellulose lacquers not only serve to give the desired color effect, but actually retard the breakdown of the film by ultraviolet light.

The ideal pigment for a toner is one chemically inert, possessing good permanency, low oil absorption, soft texture, great tinctorial strength and good hiding power where opacity is desired.

Pigmented shellac toners are also available and are preferred where natural dyes or oils may bleed from the wood.

Toners offer advantages over bleaching by simplifying the finishing operation, reducing costs, allowing lower grades of wood to be used and offering greater resistance to color change. In addition, a toner system offers a wide range of available colors, can eliminate many uniforming problems and can be adapted to high-speed forced-drying schedules. The disadvantages of this type of finish include its inability to match the brilliance, clarity and depth of dye-stained woods, the skill required by the sprayer, and the painted effect produced on furniture made of close-grained woods.

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FAMOWOOD is the answer . . . where wood finishes are important. Simple to use . . . efficient, lasting, time-saving, when filling wood cracks, gouges, nail and screw holes or correcting defects. Dries quickly, does not shrink. Stays put under adverse conditions. FAMOWOOD sands easily, does not gum up sander. Takes spirit dye stains freely. Waterproof and weather-proof when properly applied. Ready to use — "right out of the can." Fifteen matching wood colors . . . with amazing matchless wood finishes.

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Mahogany normally requires two toner coats to give adequate coverage, reduce bleeding and eliminate wash-coats.

There are many new and attractive effects possible through the use of toners and high-colored fillers.

## APPLICATION TECHNIQUE

Most production furniture finishing systems involve spray application of stains. Items like chairs and small occasional pieces are often dip stained. Brushing and sponging are employed to a lesser extent and are basically shop rather than production techniques.

In spraying, low air pressures and narrow fan patterns are generally preferred. They develop greater uniformity, reduce solvent loss and minimize the fire hazard and spread of toxic fumes.

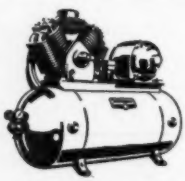
Low- and medium-cost chairs and similar items are difficult and costly to spray, consequently, a dipping technique is normally employed. Large open tanks are used and formulation balance is difficult to maintain because of high solvent loss.

The technique of flow coating has received acceptance from several manufacturers and this method deserves further investigation. Flow coating uses a gear pump and hose with a flow nozzle by which the stain is pumped and flowed over the surface. The stain tank is covered with a fan-shaped work table so that the excess stain can drain back into the tank through a small opening. Less space, lower solvent loss and reduced fire hazards are the main advantages of this method.

**The next article in this series will be on wood fillers.**

## Better Finishes Mean Better Sales

A successful sales picture is often the result of the good looks and appeal that a quality finish gives. Better finishes at lower cost mean increased sales and higher profits. That's what you get with DeVilbiss service and quality products. Find out how, today.



*Air Compressors*

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*Spray Guns*

# Furniture sales start with the finish!

**For years,** manufacturers of fine furniture have depended on DeVilbiss spray equipment to achieve the quality finish that complements excellent design and fine craftsmanship.

**In this picture,** the operator is using the new, lightweight DeVilbiss JGA spray gun to apply a second coat of lacquer. Only one pound, six ounces in weight, this gun makes furniture finishing—and all other finishing and painting jobs—quick and easy with all types of materials.

**DeVilbiss** floor-type booth exhausts fumes, overspray and vapor, and the safety-approved lights give scientific illumination. Dependable air and fluid flow is assured by the use of a DeVilbiss air transformer, hoses and paint pumps. A DeVilbiss air compressor completes this integrated spray system—all units balanced with one another for maximum efficiency.

**Electrostatic,** manual, automatic, steam or hot material – our broad experience covers *all* spray-finishing methods. Your nearest DeVilbiss supplier will be glad to give you complete data on the proper equipment for your spraying operations. Call him today, or write to us direct.

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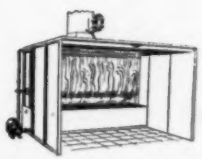

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With this modern coated abrasive application on hand, you'll come up with finer finishes and increased production on all your Pump Drum Sanding jobs. A cool-cutting BEHR-MANNING abrasive belt running over sectional cloth buffs on a Drum Sander Spindle makes this possible. Though your finishing problem might be different, a BEHR-MANNING Field Engineer will gladly recommend and demonstrate a solution right in your plant. Call him or write Behr-Manning, Troy, N. Y., Dept. WD-9.

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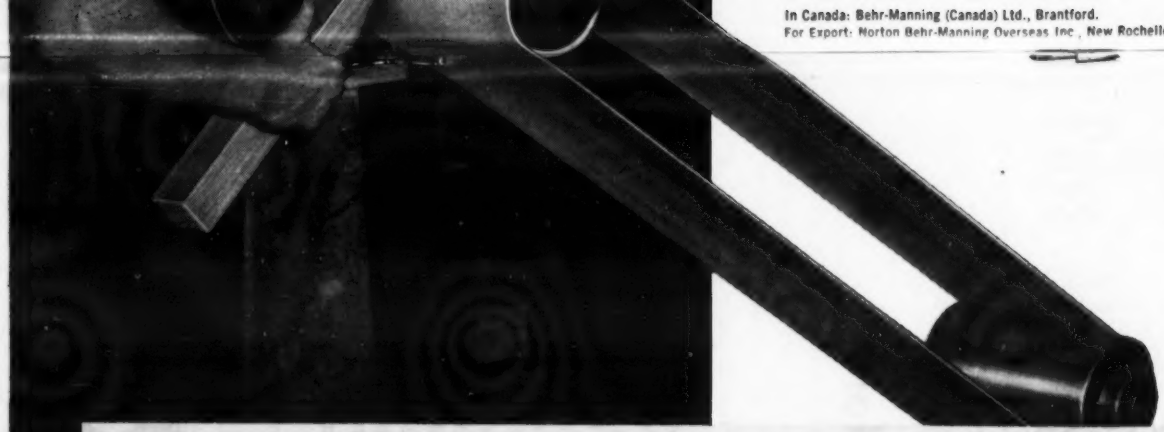
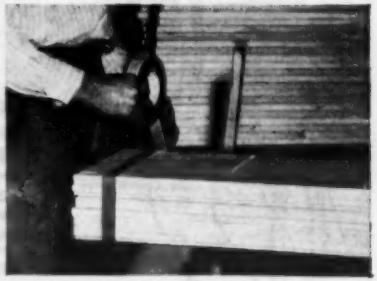


Tufbak Paper is a favorite for smoother wet-sanding between coats.

Garnet Finishing Paper is tops for all your hand sanding operations.



Behr-cat Strapping Tape holds tight without damaging wood surfaces.

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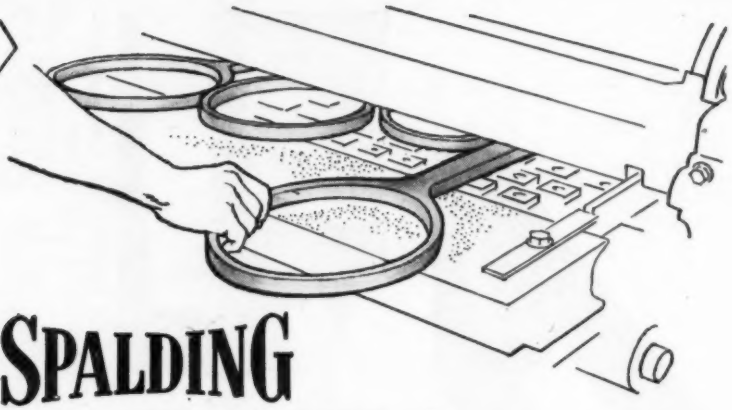
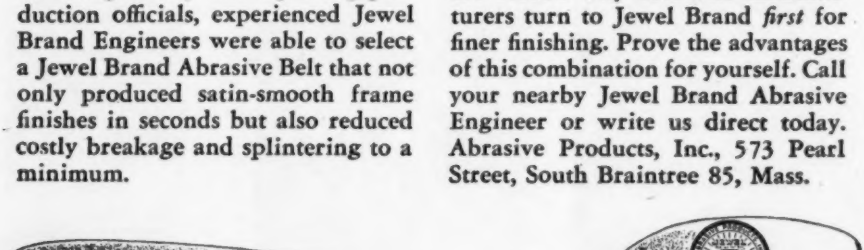


# how SPALDING finishes flawless frames for top flight tennis rackets!

**Glue** removal and the final finishing of top quality tennis rackets used to be a costly production problem at the world-famed A.G. Spalding & Bros. Inc., plant at Chicopee, Massachusetts — until Jewel Brand Abrasive Engineers helped save the day!

**Working** closely with Spalding production officials, experienced Jewel Brand Engineers were able to select a Jewel Brand Abrasive Belt that not only produced satin-smooth frame finishes in seconds but also reduced costly breakage and splintering to a minimum.

**This** is just one of many examples of the special knack Jewel Brand Engineers have for solving out-of-the-ordinary finishing problems. Combine the fact that Jewel Brand Coated Abrasives have earned an industry-wide reputation for longer wear plus faster, cleaner cutting and you have the reason why cost-wise manufacturers turn to Jewel Brand *first* for finer finishing. Prove the advantages of this combination for yourself. Call your nearby Jewel Brand Abrasive Engineer or write us direct today. Abrasive Products, Inc., 573 Pearl Street, South Braintree 85, Mass.



# PAINT HEATING Pays At Plumbers

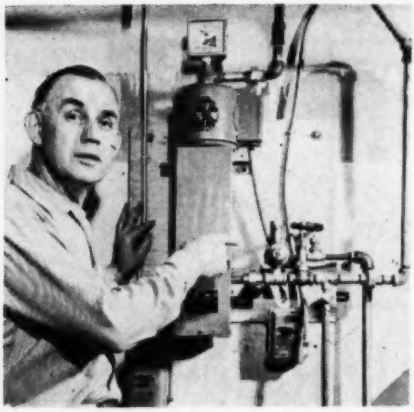
FIFTY years ago Plumbers Woodwork Company began operation. In 1905 the company manufactured wooden toilet bowls with copper linings, but later as porcelain and china began to replace the wooden bowls, Plumbers shifted to their current specialty of wooden seats and covers—a business that has prospered throughout the years. This firm, located at Algoma, Wisconsin, markets under the trade name "Badger Brand." Plumbers Woodwork Products features a full line of toilet seats in wood, molded plastics and rubber. All manufacturing operations for wood and plastic seats are carried on in this plant. It is a study of the firm's finishing operations which we particularly wish to consider in this article.

Early in the company's existence, painting was accomplished with gravity feed at each paint station, but four years ago the firm installed a pressure system thereby permitting central mixing and storage of paint rather than individual units at each booth. Last November they installed the DeVilbiss paint heating system, thus bringing modern breath into an old industry.

Equipment at Plumbers Woodwork plant includes four spray booths, one MH506KW water heater, four MH501 heat exchangers, four MCB-510-2-FX spray guns, four HG516 fluid regulators, sixty gallon pressure feed paint tank and eight feet lengths of heated fluid hose. Operation is at an eight pound fluid pressure, thirty pound atomized pressure and at a paint temperature of 140°F.

By installing equipment which would permit heating the paint right up to the moment of being sprayed from the gun, Plumbers have discovered a real savings in time, money and materials. Formerly the paint was mixed in small quantities and had to

*With the new system, only one coat is needed to produce a quality product.*



*This one DeVilbiss master heater serves all four spray stations.*

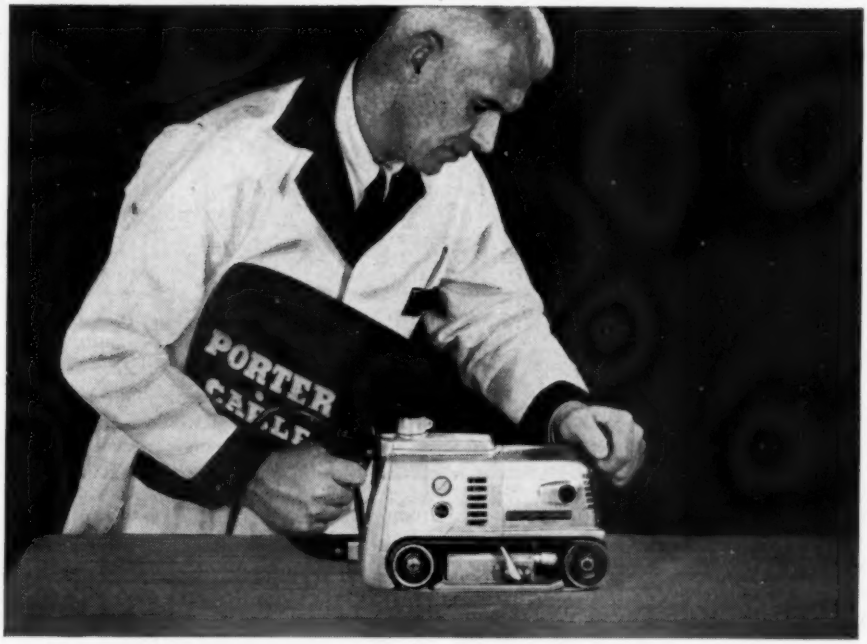
be checked several times per day. When each operator had his own setup it was difficult to get the same quality. Now this has been eliminated through the new setup. The present setup has also eliminated any lost time by the operator as spray material is ready at the gun at all times. This has greatly increased production and eliminated lost time.

Here are some of the savings brought about by the DeVilbiss heated system: amount of paint flowing through the guns has been reduced by 43.6%; air pressure has been cut two-thirds; booth maintenance reduced by 80%; increased product coverage by 40%. Says Fred E. Mueller, president of the company, "We are getting a much better finished product through faster drying, durability, accurate and dependable viscosity control, better grain-filling coverage and a greatly improved gloss surface."

Lowered viscosity through heated paint is not news to the industry, but it is interesting to hear directly from a manufacturer just what a paint heating system can accomplish. Some paint heating systems heat the paint at one location and then flow it to spray guns. This causes the paint to change temperature and viscosity between the heating place and the point of application. Oftentimes the paint has cooled enough, and thickened, from the time it leaves the heating point to the gun so that it does not atomize properly and air pressure is constantly needing to be adjusted. The DeVilbiss system provides paint heating right up to the gun, accurately controlled temperature by constantly circulating hot water for controlled gun tip viscosity.

Mr. Mueller pin-points the savings in air pressure when he says, "Our two-thirds saving in air pressure translates itself into some impressive cost savings all down the line. It means, for example, that the 23 cubic feet of air per gun per minute at 90 p.s.i. with cold material added up to 92 cubic feet per minute for our four gun system which, when compared to our present system, looks like this—we are using but 7.5 cubic feet of air per gun

*With all materials in readiness, operator loses no time and production is increased.*




# Up to 25% more production with this dustless belt sander!

Here's the lightweight, easy-to-handle dustless belt sander that's replacing old-fashioned machines and methods in wood working shops everywhere—Porter-Cable's famous Model 503.

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Powerful vacuum system removes 83% of the dust—gives maximum abrasive life, increases production up to 25%. Model 503 does the work of heavier, far more expensive machines—yet costs only **$142.** It's a *value leader* in the Porter-Cable line of *quality woodworking tools*—see it at your dealer's, or write for full information today.

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*The Plumbers Woodwork Co. manufactures wood and plastic Badger Brand toilet seats.*

per minute, or, collectively, a total of only 30 c.f.p.m. for the entire setup. When you consider the cost of compressing this much air, the power consumption and the equipment maintenance, the advantage is indeed convincing. Consider too, that we are not a small operation—up to 20,000 gallons of paint are used each year in painting the toilet seats produced by this company—that is why savings of this order are so very important to us."

Most impressive feature of the heated system has been in the reduction of overspray which, again, takes us right back to temperature and viscosity control with the accompanying air pressure reduction. Mr. Mueller says, "We are not only flowing 43.6% less material through our guns, but we are acually getting 40% more product coverage. For example, we now get 97 pieces per gallon of paint as compared to 50 with the cold spray.

"Overspray presents another problem not too often considered by many people. When you are spraying a part, the paint coming out of the gun either goes onto the product, or it goes into the booth with the air mist eventually being carried up the stack by the blower system. This, of course, deposits paint on the walls of the booth and frequently in the stack. To keep the booth in proper working order, it becomes necessary to carry out a never-ending maintenance program directed at cleaning the paint deposits caused by overspray. It stands to reason then that the less overspray you have, the less deposits you will have. It follows also, that maintenance time and costs will be much less. Similarly, you can't spray products and overhaul the equipment at the same time, so all maintenance work must either be done at a sacrifice of production or in extra hours at substantial cost.

"With the cold system we were cleaning the booths about every 30 days, and we were doing it on overtime—two men on a Saturday afternoon. Multiply this by four booths, and you begin to get the idea. In the first 30 days that the heated paint system was in effect, we used over 1000 gallons of paint with no appreciable deposit of paint on the booth equipment.

"Another alternative is to use thinner to lower the viscosity, as is the

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practice by many firms. Excessive thinning serves no useful purpose, and as soon as it is on the product it evaporates into the air. This makes it necessary to apply coat-after-coat to build up a suitable thickness on the product. With the heated system, we get nothing but full bodied paint on the product and it is there to stay. If we tried to get the coverage in one coat with cold or thinned paint—well, we just couldn't do it, the paint would run on and we would need to apply too many coats.

"The uniformity and better quality of the finished product has put us in a much better position with our competition—we are putting out a better-looking job, doing it cheaper and with only one coat."

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Saleslady: "Here's a lovely doll. You lay her down and she closes her eyes just like a real little girl."

Father: "I guess, lady, you never had a real little girl."

## PLYWOOD GREATS

*Three who received recognition at the National Plywood Distributors Association meeting.*

These are the three men who received scrolls of honor for signal leadership during the first 50 years of fir plywood. They are from left: Don L. Davis, Sr., of Chicago, president of Aetna Plywood & Veneer Co.; W. E. Difford of Tacoma, Wash., managing director of Douglas Fir Plywood Assoc., and William H. Hunt of New York, vice president of United States Plywood Corp., who accepted honor for late Lawrence Ottinger, founder of his company. Names will be inscribed in National Plywood Distributors Assoc. honor roll plaque for perpetual display at Portland, Ore., Forestry Building beside first fir plywood panel.

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### CENTURIES OLD REDWOOD STILL SOUND

A redwood log was recently unearthed near the mill town of Scotia, California. Its unusual hue of blackish brown, instead of red, is attributed to color absorbed from moist soil in which it had been buried some 40 ft. deep by a land slide, undoubtedly in the B.C. era.

Several such logs, up to 28 ft. in circumference were found by the State Highway Department while excavating for a highway by-pass. Directly above the buried logs were stumps of trees up to 47 ft. in circumference, and which were estimated to have been 1,500 to 2,000 years old when the Pacific Lumber Company logged them in the year 1889.

Who knows when this buried dark brown wood was grown, and best of all—it was perfectly preserved and not the least bit rotted.

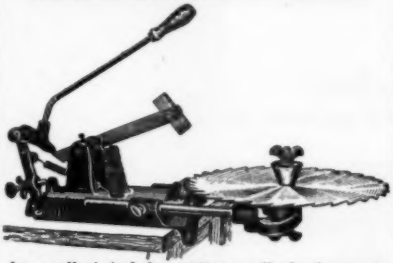
### NATIVE LAND

The National Association of Manufacturers has presented an excellent booklet, "Native Land." Purpose of the book is to safeguard America's natural resources and acquaint the public with the wise use of them. The book has been prepared by educators and industrialists to broaden public understanding of renewable natural resources and efforts toward their conservation.

Along with some very fine illustrations, there are chapters on water, soil, forests, wildlife, national parks and job opportunities in the field of conservation.

Education of the public along these lines is a job not for the public school system alone, but for all of us. Copies of the booklet are available from the association office at 2 East 48th St., New York 17, N.Y.

## SIMPLEX
### CIRCULAR SAW SETTING MACHINE



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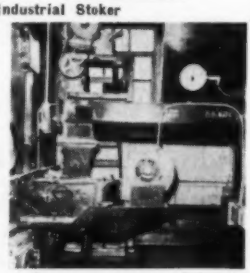

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# MOLDING PLYWOOD With Fluid Pressure

By
Bruce G. Heebink

THE molding of plywood by means of fluid pressure applied through flexible bags or blankets of some impermeable material (bag molding) has found application in making plywood parts of various degrees of curvature. In size, these parts may vary from a small aircraft fairing to a complete boat hull. Typical parts include all combinations of single and compound curvature, cylinders, paraboloids, portions of a sphere—in short, any curved piece for which a mold can be made and later separated from the finished product.

Bag-molded aircraft parts, such as fuselages, wing fillets, and fairings, are reported to offer improved performance characteristics as a result of the superiority of the stiffness-weight ratio of molded plywood to that of metal and the smooth ripple- and rivet-free surfaces presented to the air stream.

Bag molding of plywood and laminated veneer members probably had its origin in the vacuum-bag process that was introduced in the furniture industry several years ago (Fig. 1, A). While the vacuum-bag process depended upon atmospheric pressure and ordinarily only room temperature to set the glue between the plies, the newer techniques employ higher fluid pressures and varying degrees of heat.

Misnomers, such as "plastic plywood" and "plastic planes," have been applied to structures of molded plywood that are actually made from wood veneers bonded with synthetic resin adhesive. By weight, these structures are probably about 80% wood and 20% resin adhesive. Except for variations in shape, the product is essentially the same as flat-press plywood.

## METHODS OF MOLDING

Molded plywood is produced by several techniques which are often referred to specifically, as the Duramold, Vidal, Aeromold, or vacuum-bag processes. Other terms sometimes used in describing the technique are "bag-molding," "autoclave molding," or "tank molding." Perhaps the most inclusive is the term "fluid-pressure molding." Five general methods are shown

Mr. Heebink is an engineer at the Forest Products Laboratory, Madison, Wis. His paper is printed with permission.

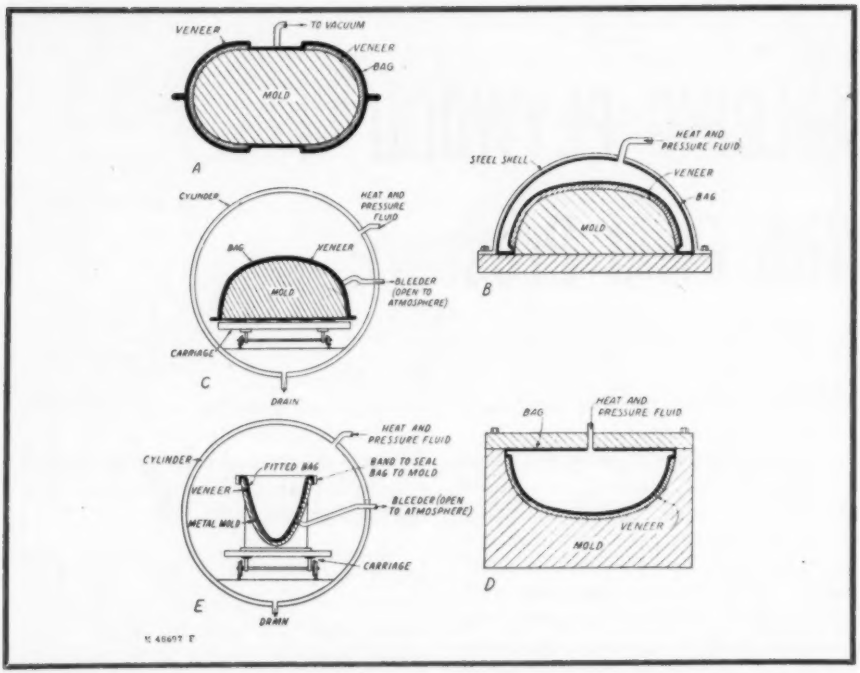



***Figure 1. Five methods of forming bag-molded plywood.***

in Figure 1. The fundamental procedure is the same for all processes in common use. In principle the technique consists of attaching temporarily by staples, tape, clips, or some other means, superimposed layers of strips or sheets of glue-coated veneers to a mold, and molding these into a unit structure by the application of heat and fluid pressure through a flexible, impermeable bag or blanket. All the processes are relatively simple and provide a means by which plywood of simple or compound curvature, and of constant or varying thickness, in any arrangement of plies can be produced.

Flat plywood can also be made by bag molding, but flat plywood can be produced more economically by other methods so that the bag-molding technique is largely limited in use to the production of molded parts that can be manufactured by no other practical means. In general, parts that fall in this category will have one or more of the following characteristics: Appreciable compound curvature; variable thickness; single curvature bends approximating or exceeding 180° (when pieces are too thick to be steam bent from flat plywood); parts too large to be made practicably by mating dies; quantity too small to justify mating dies.

The application of heat to the glue during the pressure period is the basic difference between current bag-molding methods and the older vacuum-bag

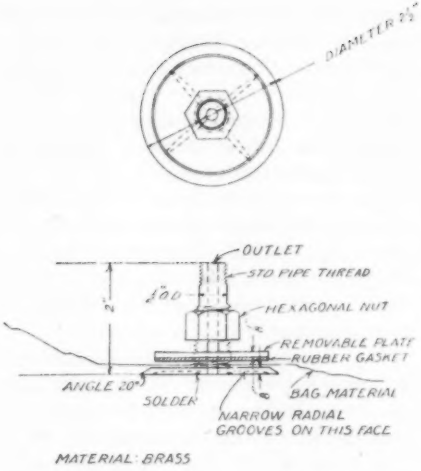



***Figure 2. Metal bleeder connection designed for rapid attachment to bags.***

process. The newer processes, therefore, permit the use of thermosetting and thermoplastic glues with long assembly periods. Most of these newer processes use pressures within the range of 30 to 100 pounds per square inch instead of only the atmospheric pressure used in earlier work.

Figure 1 illustrates diagrammatically the processes in use at present: A, the vacuum-bag process, B, C, D, and E, techniques employing higher pressures and heat. There are numerous combinations of these five means of supplying heat and pressure.

Perhaps 95 percent of the bag-molded plywood now being produced requires bags of natural or synthetic rubber. Cellophane bags have been used, but only experimentally, in these three methods.

Full utilization of rubber bag materials requires that bags be used to maximum life. Under these conditions, leaks developing from deterioration of the bag during the repeated application of heat and handling are unavoidable. Steam, steam-air mixtures, and water as heating and pressure mediums, when used with a leaky bag, cause considerable damage to the part being molded and often to the mold itself. This difficulty has prompted many users of the bag-molding technique to experiment with other fluids, such as air or inert gas, in their search for a more satisfactory pressure and heating medium.

Gases have very low specific heats and using them to transfer heat to the part limits the rate of production. Furthermore, tests have shown that hot air is particularly damaging to all rubber bags, consequently these heating mediums are most logically used in combination with cellophane or some other substitute bag material that is cheaper than rubber.

Bag leaks should be avoided regardless of the pressure fluid used. Preliminary tests have shown that even relatively small leaks can cause as much as 20% reduction in net pressure applied on the glue joints. The pressure loss depends upon the size of the leak and the restriction under the bleeder fitting.

When using a gaseous fluid as a pressure medium, the heating time can be greatly decreased if the mold is heated directly by steam or electricity. Heat is thus transferred to the glue lines by conduction rather than by convection. In this method, heat travels from the mold to the plywood and the bag stays relatively cool, thus broadening the selection of usable bag materials.

All the methods thus far discussed anticipate the use of pressures con-

siderably in excess of atmospheric. It is possible under certain limited conditions to produce bag-molded plywood of durable quality using only a vacuum within the bag to develop the external pressure of the atmosphere. However, by this method, good results are obtained only with thin, flat veneers, on relatively flat molds, with a limited number of glues. Low-temperature-setting glues with sufficiently low curing temperatures might also be used with the vacuum-bag process in a warm room in producing small parts that can be assembled in a relatively short time.

## EQUIPMENT FOR FLUID-PRESSURE MOLDING

The forming of any piece of fluid-pressure-molded plywood requires a mold of some type. Molds, sometimes called forms, dies, or mandrels, are broadly classified as male or female. Male molds as illustrated in Figure 1, A, B, and C are the desired shape on convex surfaces, while female molds (Fig. 1, D and E) have the proper shape on concave surfaces.

Common mold materials are wood (solid or plywood), metal (steel, cast iron, or low-temperature alloys), plastic materials, and cements. The choice of mold materials will depend largely on the shape of the item to be molded, the quantity desired, and the availability, advantages, and disadvantages of the materials considered.

## WOOD MOLDS

Wood molds are commonly made of softwood lumber, such as Western white pine or sugar pine, cut approximately to the contour of the mold and glued and nailed together. The rough shape, usually not more than 6″ thick at any point, is then marked into stations—a procedure very similar to that used in defining the shape of a boat—and worked down by plane and sander to the desired shape minus an allowance for a hardwood skin. This hardwood skin (often of birch veneer) is bonded directly to the mold by bag molding and is later worked carefully down to the exact contour at each station. Attention is given to the direction of the grain in both the skin and the mold proper so that the maximum cross-banding effect is obtained.

Wood molds are distorted somewhat by repeated exposure to moisture and heat. A leaky bag often results in damage to a wood mold and the piece being molded is usually ruined. Overheating the mold will hasten the distortion and necessitate early recontouring or other repair. Much of this distortion and cracking is caused by exposing the hot surface of the mold to the air after the removal of the molded piece from its surface. By cooling the mold while in the bag this rapid surface drying can be minimized. Cooling can be done by a cold water spray system in the cylinder or in a special cooling booth installed near the cylinder.

Plywood molded on thick wood molds heats more slowly than the same thickness and construction on thin steel molds. The time required to mold the piece, therefore, is about twice as long as for the same construction on a thin steel mold.

A variation of the wood mold construction that may be referred to as a "plywood-shell mold" is sometimes used. These molds are produced on a master mold of the usual lumber type. The shell mold itself is similar to the finished molded plywood article, only much thicker (¾″ to 1½″) depending upon its size and the degree of

curvature. The face veneers of these molds are sometimes impregnated with resin which is cured at the time of bonding.

Another construction that should produce a more stable mold involves the use of thick, resin-bonded plywood instead of solid wood stock in the body of the mold, with an impregnated skin of veneer bonded to the plywood base. The plywood should be laid so that its shrinking and swelling in thickness will introduce the least dimensional changes in the mold.

Wood molds are almost always male in shape, which necessitates fastening the strips of veneer to the mold to hold them in place on the convex surface. This is readily done by means of staples that must later be removed.

Wood molds are well adapted to the formation of a molded plywood aircraft or boat skin and permit bonding the skin to stiffeners or ribs in the molding operation. In this process the ribs are preformed by laminating or steaming to exact shape. They are inserted in previously cut slots in the face of the mold before the veneer strips are stapled in place.

## METAL MOLDS

Metal molds are usually made of sheet steel or cast iron. Alloys having low melting points are also reported to be in limited use. Molds of single or very slight double curvature are made of sheet material 1/10" to ¼" thick, while those of severe double curvature, such as for an airplane tail cone, are often cast. Metal molds are very stable but those which are cast must be machined which makes them expensive and often difficult to obtain. In most cases, metal molds are of the female type in which the strips of veneer are taped together or sprung in place between metal clips, thus eliminating the necessity of a tacking surface to which material can be stapled.

Metal molds, particularly those of sheet metal, have the advantage of very rapid heat transfer. The rate of temperature rise in a molded plywood piece on a thin metal mold approaches that of plywood of the same thickness in a hot press. The time in the pressure cylinder, therefore, can be approximated from the hot-press instructions for the particular glue being used by adding the actual pressing time to the time required to bring the pressure cylinder up to operating temperature. Heavy cast metal molds heat more slowly than sheet metal molds but the heat transfer will probably be more rapid than for wood molds. For any kind of mold the rate of heating is affected by the heating medium.

Molds in continuous use may require cooling before they can be used for the next lay-up. This is particularly true of small metal molds of consider-

*"He drops in every day. 'A change from knot holes and burls', he says."*

able thickness, and with this type, cooling is usually done with cold water. Large molded pieces require a longer time for removal, and consequently the mold may be sufficiently cooled before it is again ready for use.

## CEMENT MOLDS

If a cement or concrete mold is used, a wood form must first be made to cast the section. After this is done it is sometimes necessary to bond to the mold a tacking surface of wood or possibly some other suitable material. Cement molds have the advantage of being stable towards moisture but are excessively heavy and cumbersome to handle and are damaged somewhat by repeated heating.

## PLASTIC MOLDS

Some attempts have been made to use casting resins, and other materials which can be poured, in mold construction, but to date these uses have been mostly experimental and have proved practicable in relatively few cases.

## BAGS OR BLANKETS

The purpose of the bag or blanket is to provide a flexible impervious barrier between the fluid under pressure and the mold. The piece being molded is pressed between this flexible bag and the rigid surface of the mold and the full fluid pressure is applied at right angles to the surface of the bag regardless of the shape. The pressure at certain glue joints may be slightly less than the full fluid pressure by the amount necessary to shape the veneer or to force it into place.

Bags are classified as full bags or half bags (blankets). A full bag is a complete envelope of impervious flexible material (Fig. 1, A and C) clamped shut at one end or side and having a connection, usually called a bleeder, to allow the entrapped air to escape to the atmosphere. It may be completely closed, similar in principle to a basketball bladder (Fig. 1, B and D), having only a tube connection for inflation. A half bag, or blanket, is a sheet which normally fits the mold without wrinkling and is sealed by some temporary means to the edges of the mold (Fig. 1, E). The bleeder may be attached to the mold or to the bag. Full bags are normally used over male molds and half bags are used on female molds.

Because half bags do not support the weight of the mold, abrasive wear is less and their life is greater than that of full bags. The use of fitted half bags is advised where production is high and they can be tightly sealed to the mold.

The useful life of a bag depends on the type of material used in the bag, the heating medium used, the temperature of the cycle, the size of the bag, and the care used in handling. It may be as short as 10 hours or as long as 200 hours of operation.

The type of bag and the material from which it is made depend largely on the molding process to be used, the temperature, and the heating medium. Most current bag-molding operations require bags made of specially compounded natural or synthetic rubber, often reinforced with fabric.

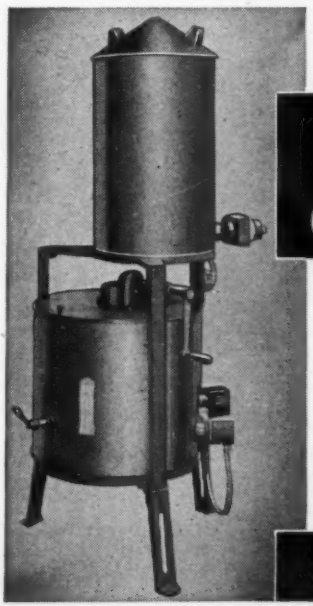
Efforts are being made to find additional bag materials and means of increasing the production of molded plywood per pound of material used. In tests at the Forest Products Laboratory certain polyvinylidene chloride, vinyl butyral resin, and cellophane films have shown some promise as bag-molding

materials. The use of short-lived materials necessitates the frequent attachment of bleeder fittings. Figure 2 illustrates a convenient metal bleeder fitting that has been used satisfactorily with rubber as well as other bag materials.

Present information indicates that, in ordinary use on a steam-air cycle at temperatures of about 250° F., the life of a rubber bag is approximately 50 operations on a full, unfitted bag. Repair of minor leaks, usually caused by rough handling, may be necessary during this period. The use of hot water or pure steam for heating reduces oxidation and greatly increases the life of a bag. With a thick, fitted, half-bag assembly, considerably more than 100 operations may be expected in steam at 300° F.

Whenever a steam-air mixture is used and the air is introduced under pressure from a compressor, an adequate after-cooler and air filter should be installed between the compressor and the cylinder. When all traces of oil in the form of vapor or small drops are removed from the air, the bag life is considerably increased.

Tests at the Forest Products Laboratory have indicated that synthetic rubber bags are generally more resistant to heat, both dry and wet, than natural rubber. In these tests also, a steam-air mixture at 250° F. was found more damaging to all bag materials of rubber or synthetic rubber than pure steam at 300° F. or even 320° F. Where conditions permit a choice between these two heating mediums, the use of pure steam at 300° F. (52 pounds per square inch) is recommended to gain the advantage of a longer bag life and a shorter heating cycle.

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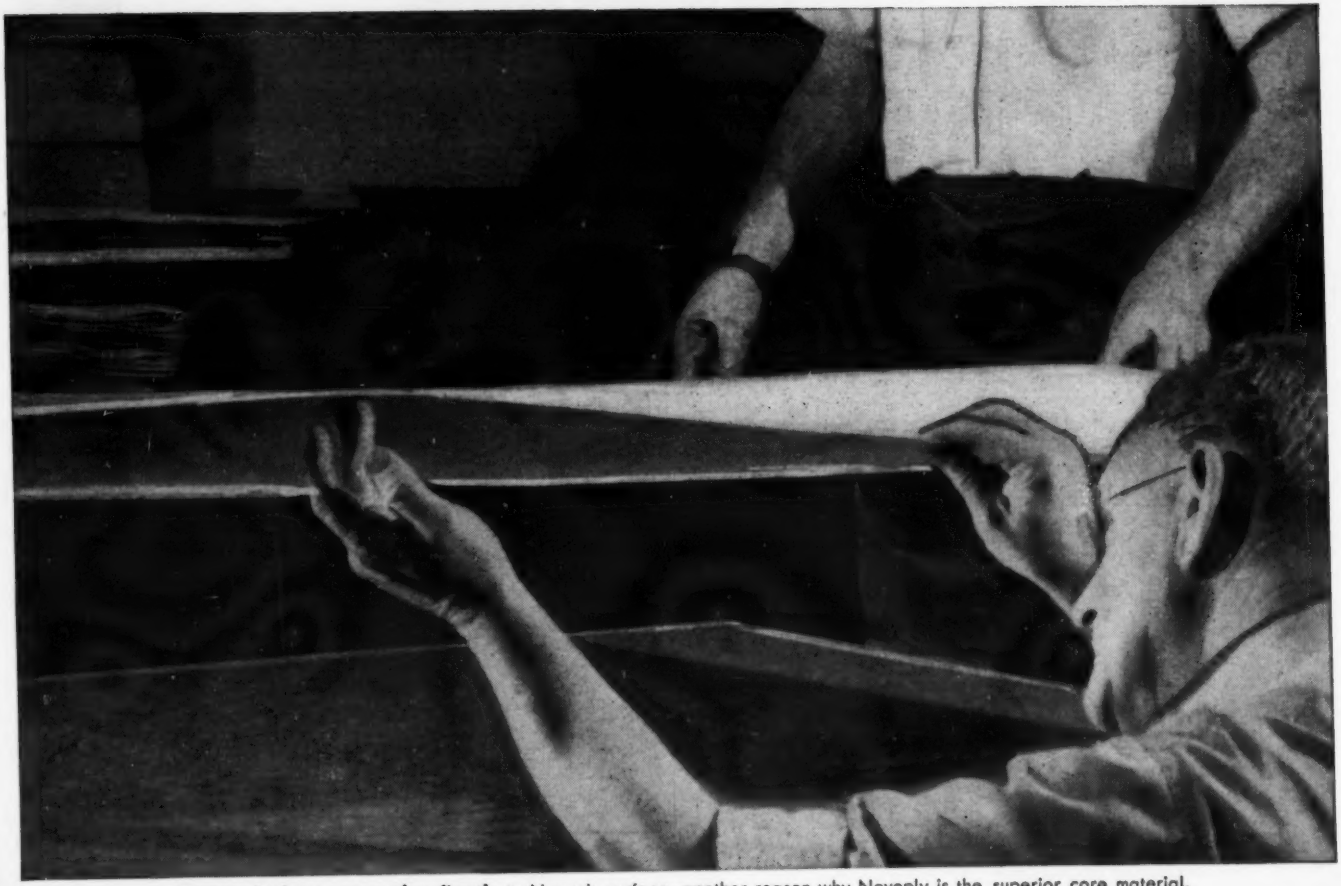

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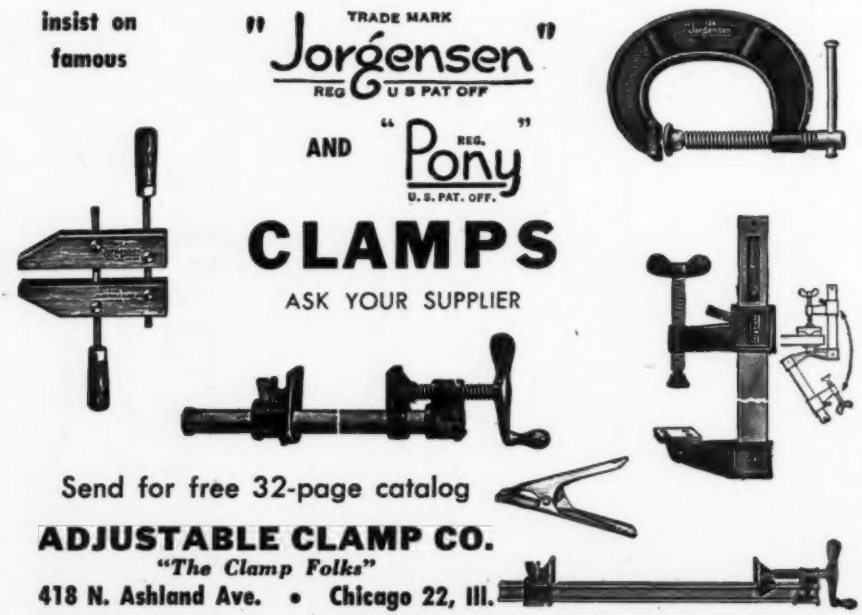
Normal rubber bag thicknesses are between 1/32″ and ⅛″ depending upon the amount of reinforcing, the severity of handling, and the type of bag molding. The thinnest bag capable of withstanding the handling and mechanical wear is recommended. A thin bag has several advantages; probably most important is its more rapid heat transfer. When thin bags are used, wrinkles in the bag are less likely to leave their marks on the bag side of the piece being molded. This is important with thin veneers, since a thick bag could easily produce an area of poor glue joint as much as ¼″ wide and several inches long as a result of reduced pressure under a fold in the bag. A practical guide, whenever bag wrinkles are likely to occur, is to use a bag no thicker than the face veneer. The economy of using thin bags is obvious, provided the bag is strong enough to withstand the handling.

In all bag-molding it is advisable to use a layer or two of paper, cloth, or canvas between the plywood being molded and the bag. This facilitates the "bleeding" of air and steam to the outside and also minimizes adherence of the glue squeeze-out to the bag. It is advisable to cover any sharp corners at the edges of the molded plywood piece with extra layers of canvas to prevent injury to the bag.

When a rubber bleeder hose is used, as in Figure 1, C or E, it must not collapse and close when external pressure is exerted upon it during the molding cycle. Collapse of the bleeder hose within the cylinder is difficult to observe. Emission of a slight amount of air or steam from the bleeder does not guarantee that it is functioning

properly. A flexible metal hose, a copper tube, or a suitably reinforced rubber hose is recommended for the bleeder where this type of hose provides the necessary flexibility.

In using the methods shown in Figure 1, A and C, careful attention should be given the inside surface of the bleeder fitting in the bag. If this is very smooth and flat, it may make an airtight fit and stop the bleeder from functioning. Grooves in this fitting, as shown in Figure 2, or a piece of coarse burlap glued to it, will usually suffice.

## PRESSURE AND TEMPERATURE EQUIPMENT

All pressure cylinders for use with bag-molding should be hydraulically tested to a pressure of at least double the maximum working pressure used. An adequate safety valve should always be installed if the pressure of the steam or air supply is in excess of the pressure at which the cylinder was tested.

The sensitive elements placed within the pressure cylinder for controlling and recording conditions should be carefully installed. Heavily jacketed controls will lag and therefore will not record the actual cylinder temperature during the rapid heating-up period. A jacketed thermometer was found in experiments at the Forest Products Laboratory to be as much as 20° to 30° F. below the reading on a bare thermocouple in heating a cylinder two feet in diameter and six feet long to 250° F. in five minutes, using a steam-air mixture.

If temperature stratification exists in the cylinder, a temperature-recording bulb at the top of the cylinder may be 30° F. or more above the actual temperature at the bottom of the cylinder; provision for circulation should therefore always be made if possible. A good check on uniformity of temperature may be obtained by inserting bare thermocouples in the top and bottom of the cylinder.

A large inlet for the heating medium is advisable, so that the cylinder can be brought up to the desired temperature and pressure in five minutes or less. This rapid heating is usually advisable and requires high boiler and compressor capacity for large cylinders.

**(To be continued.)**

**Next month's installment will describe glues recommended; include a table of methods for molding plywood and a list of suppliers.**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# PLYWOOD with Fibre Layers

By Thomas Perry

THERE are intermediate types of fibre faced plywood which might be considered a product more or less midway between normal plywood with veneer faces and the metal clad plywood described in the previous article in this series. There are many applications where the extreme density and hard wearing dent-proofness of plymetal are not required and where the extra weight of the metal layers might be a disadvantage, but where surface smoothness and paintability are important. In addition most of the plymetals require special tools for cutting and nailing, which usually are not available in woodworking shops.

Fibre faced plywood meets this intermediate demand, with its semi-dense smooth surfaces, and the underlying cross laid strength of the plywood itself. It has the distinct advantage of being suitable for cutting on standard woodworking machinery, and is much lighter in weight than metal faced plywood. It is a considerably more recent development than the plymetals and is available in several types from a number of sources. Most of these fibre faced products are made in standard grades and sizes, and are available through regular trade channels, although there are custom made types designed for special uses. They range from an outer layer of relatively inexpensive paper, as in "Craveneer" for packaging, to a hardboard face on fir plywood, "plyron," which has a multitude of applications. A few types will be briefly described, more or less in the order of their development, which happens to start with the medium density faces and progress toward the more dense types.

## PAPER FACED PLYWOOD

**Tekwood.** This is probably the oldest and best known of the paper faced plywoods, having been developed by the St. Croix Lumber Company of Laconia, New Hampshire, in the late 1930's. The plant was subsequently acquired by and is now operated by the United States Plywood Corporation, which controls the basic patents and trademark. Actually it is a paper faced veneer, consisting of two outer sheets of sulphate cylinder Kraft liner board about 1/30″ thick, glued to a central layer of hardwood veneer, usually birch or maple. It has the normal color of brown Kraft paper, and the standard thicknesses are 3/32″ and ⅛″. It is an interesting commentary on this construction that all the layers of Tekwood are derived from wood, the inner layer in the form of rotary cut veneer, and the outer layers as a paper, in which

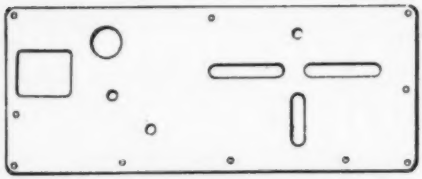

*Fig. 1. Die cut blank of Tekwood.*

the wood chips have been chemically reduced to fibres and mechanically reassembled into Kraft paper under heat and pressure. The grain of the veneer is across the 4′ x 8′ panels, while the grain of the paper is lengthwise. This preserves the basic cross laid principle of plywood, which has proved to be so useful in all branches of woodworking. The paper and veneer are bonded into single sheets, using standard hot pressing techniques and synthetic resin adhesives.

Tekwood is light in weight, 2.75 oz. for ⅛″ and 2.40 oz. for 3/32″, per square foot, and is rather limber so that it can be curved and bent for interior cabinet construction. Under heat it can be curved into an 8″ diameter cylinder and 12″ cylinders have been formed cold, with triple rolls, such as tinsmiths use.

Tekwood can be cut or punched into many useful and artistic shapes. The simpler designs can be made with steel cutting rules, although steel die punching is preferable for accurate reproduction in large quantities. The bond between the paper and veneer is such that no roughness occurs on the edges of die work, providing the tools are sharp and properly adjusted. An example of such die cutting is shown in Fig. 1. Holes as near to the edges as ¼″ can be made satisfactorily and without damage to the material. Cutting, drilling and molding edges can be done with hand or power tools.

Tekwood finds extensive use in radio and TV chassis, as well as for shelves, partitions and backs. Furniture makers utilize it for dust bottoms and mirror backs. It is an ideal material for advertising novelties, models, display and demonstration outfits, as well as for toys, games and play equipment. The baggage and packaging industries have found it an excellent material for many of their products. Durable and rigid shipping and storage containers are easily made of this product. Corners can be creased, partially cut with steel rules or recessed with saws or routers for bending into a variety of shapes and sizes. An example is shown in Fig. 2, which may have nailed plywood ends, or alternately, bent Tekwood ends, as shown in the small sketch at the right, which uses staples instead of nails. When properly cleated, Tekwood makes excellent shipping containers of substantial size and rigidity.

Standard Tekwood has good moisture resistance, but is not suitable for weather exposure or for continuous use in damp locations. Surfaces are easily painted or may be finished in the natural brown color. Standard sizes are 4′ x 8′ and 4′ x 4′, 3/32″ and ⅛″ thick, and stocks are available generally in plywood warehouses. Extra lengths are obtainable on special order.

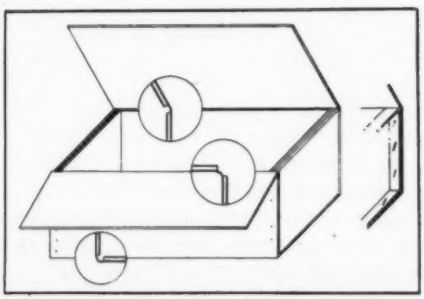

*Fig. 2. Tekwood box and folding cover.*

*Fig. 3. Lapped siding of medium density overlaid plywood.*

The demand for Tekwood, which now averages over 30 million square feet per year, has prompted the makers to offer several additional types or constructions for special applications, other than the standard noted above.

A preservative grade is available, in which the paper faces are impregnated with an asphalt resin combination, giving it a black color. Thickness is 5/32″; it has substantial resistance to mold and fungus growths, and is definitely repellent to rodent depredations.

A special packaging grade with 1/20″ veneer and thinner (1/64″) paper, totaling about 1/12″, is especially intended for low cost closure applications.

Extra thick paper layers (1/16″) on ⅛″ veneer, making a thickness of 3/16″ can be had for unusually rough service.

Still another special thickness is the ¼″ Tekwood, with a 3/16″, 3-ply center and the regular (1/30″) paper faces.

**Craveneer.** This is a packaging type of paper faced veneer, developed and made by the Chicago Mill & Lumber Company at one of their southern mills. It utilizes native hardwood veneer for the center layer and a Kraft type of paper, 1/64″ thick, for the outer layers. It is made in a continuous web, the veneers being interleaved between two webs of paper, to which the special

*Fig. 4. Roadside traffic signs of medium density overlaid plywood.*

*Fig. 5. Smooth reinforced concrete wall of overlaid plywood, Conrad Hilton Hotel, Beverly Hills, Calif.*

adhesive has been applied, and roller bonded under heat and pressure. Its chief application is to a wide variety of containers, but it is also used for bottoms and backs in the furniture and cabinet trades. Standard thicknesses are 3/32", ⅛" and 5/32", and sizes are custom cut for container or other requirements. It is not generally available in plywood warehouses and thus finds very limited use in the structural and general woodworking fields.

**Overlaid Fir Plywood.** This is a modified form of Douglas fir plywood, developed on the Pacific Coast largely during the last ten years. It has all the characteristics of standard fir plywood, and in addition, thin higher density faces of impregnated paper or cellulose sheets. The roughness and porosity of the normal wood surfaces is entirely eliminated. It is made by standard hot press methods, in single sheets, using impregnated paper as the outer layers of the plywood, and the whole assembly is glued together in one pressing. It eliminates all sanding and the consequent losses in thickness. Both impregnants and adhesives are limited to those that will meet the rigid specifica-

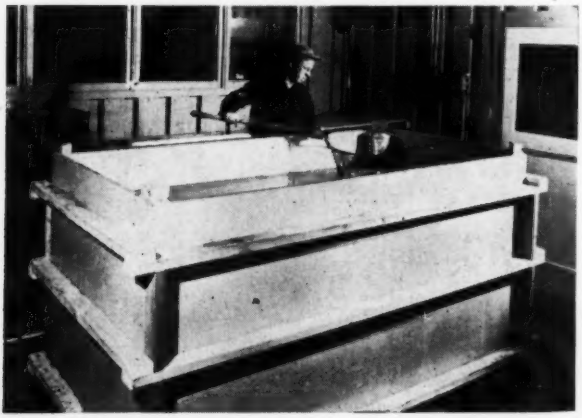

*Fig. 6. Plywood tank for bait or other marine storage.*

*Fig. 7. Welchboard siding on a ranch type house.*

tions for EXTERIOR TYPES (CS-45-55), and therefore it can be used under the most extreme conditions of exposure.

Overlaid fir plywood can be cut and drilled with hand or power tools with the same ease that normal fir plywood can be worked. It is equally suitable for fastening with brads, nails, screws and bolts. In routing, shaping or jointing the edges, the protective character of the outer cellulose layers almost entirely eliminates tendencies to develop rough edges and splinters. Standard thicknesses start at ¼" and range up to ⅜", with thicker constructions available for special uses. Standard sizes are 4'x 8' and greater lengths can be had for unusual applications.

Overlaid plywood is available in two types, medium density and high density, differing principally in the amount of impregnant contained in the outer cellulose layers.

**Medium Density Overlaid Plywood.** This product is characterized by outer impregnated cellulose layers containing at least 20% by weight of a thermo-setting resin. The pressure at which this plywood is bonded insures a smooth, but not glossy surface, that has an excellent "tooth" for applying and retaining paints and finishes. The paper layer is opaque, completely masking the wood grain, and is normally a light buff color, although other identifying colors may be had on special orders. It is especially designed for painted surfaces, in both interior and exterior applications.

For exterior uses, this medium density type is also available in 12", 16" and 24" widths for lapped horizontal siding, as is illustrated in Fig. 3. There is no splitting due to nailing and wedges are provided for flush end joints. Full width panels can also be used for siding, and a grooved "plank" style is also a stock item.

Another interesting development is that of roadside signs for traffic controls, Fig. 4. This medium density overlaid plywood offers many advantages of paintability and workability, with a stiffness and springiness that prevents bending, twisting and other impact damage. Such plywood will not rust nor corrode, is not deteriorated by weather exposure and can be used with standard and reflecting paints. It is claimed that such signs have a useful life of 8 to 15 years, subject to occasional repainting.

There are many other applications, interior cabinets, partitions, furniture—wherever plywood can be used and painted surfaces are desirable.

**High Density Overlaid Plywood** differs from the above in having not less than 40% by weight of a thermo-setting resin in the impregnated cellulose layer, which, however, is translucent and

*Fig. 8. Worktable tops of Plyron.*

allows the natural grain pattern to show through. Pressures in the hot press operation are higher, resulting in a high gloss surface of a higher density, which does not require painting even under severe weather exposure.

An important use of this high density type is concrete form work, where smooth surfaces are imperative. An unusual application was made in connection with the Conrad Hilton Hotel at Beverly Hills, California, where a multi-story smooth wall was essential for the architectural effect. The forms were slipped upward for each concrete pouring, as is shown in Fig. 5. All plywood surfaces were sprayed with oil for easy removal and many of the panels were used as many as 50 times. The plywood used was ⅜", 5-ply. Equally satisfactory results can be obtained for columns, piers, girders, bridge arches and the like. Curves can be employed in such forms, depending on the thickness of the plywood and the degree of curvature.

Another radically different example is the tank illustrated in Fig. 6. This was made of high density overlaid plywood, and obviously it was one of the most severe immersion tests that could be devised.

This high density type is equally suitable for the uses indicated for the medium density type, when painted surfaces are not desired, such as siding, cabinets, table tops, storage bins and the like.

**Welchboard.** This is similar in appearance to the medium density overlaid plywood and is usually included in this classification. It meets the EXTERIOR TYPE requirements and finds extensive use in house construction and other applications already enumerated. Its use in 12" horizontal siding is illustrated in Fig. 7.

Welchboard differs from overlaid plywood in having a thicker face, about 1/16", consisting of a finely ground wood aggregate and binder, which is directly bonded on the 3-ply (or multiply) center under heat and pressure. It was developed by the West Coast Plywood Company, which controls the patents and manufacturing rights.

## HARDBOARD FACED PLYWOOD

**Plyron.** This is a little beyond the field of a paper faced plywood, as the faces are made of hardboard, 1/10" or ⅛" thick. It could be more correctly described as fibre faced plywood. These outer layers are made of cellulose fibres by a process quite different from that employed in paper making. The original technique developed by the late William H. Mason, at his Laurel, Mississippi mill, was to "explode" the wood fibres by saturating the wood chips with high pressure steam and suddenly releasing the pressure. I visited this mill in the early years of the development program, and was given an opportunity to open this re-

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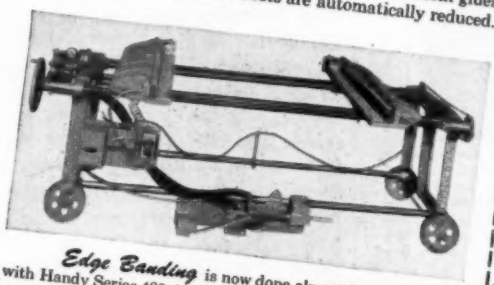

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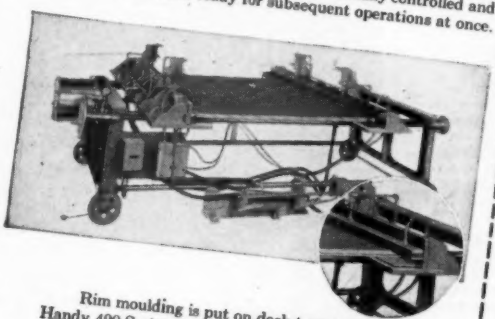

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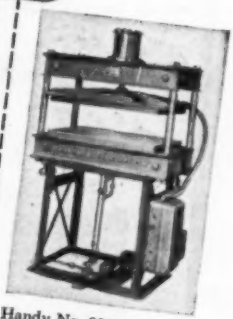

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lease valve. The force of the explosion was terrific, but the wood was reduced to shreds and readily matted into the low and medium density insulation boards that were then the major objective of the Masonite process. It is significant that the lignin was not removed in this shredding process, but remained with the fibres as the bonding agent as they were hot pressed into the insulating material.

There is an intriguing story about the discovery of Masonite hardboard that has come down through the years. It is probably based on facts, but how generously it has been embellished in its many retellings may well be a matter of doubt.

At the time of the story only two types of insulating board were in production, low density, requiring about 30 lbs. p.s.i. in the multi-opening hot presses to reach the ½" thickness, and medium density, which needed about 100 lbs. to reach its final thickness of ¼". Automatic pressure regulators were provided to limit these pressures until the desired dryness had been obtained. The press room was unbearably hot and the press operators didn't need much of an excuse to take a breather in the open air outside the mill. On one such excursion, one pressure gauge failed to release at the maximum limit and the pressure climbed to some 500 lbs., reducing the thickness to about ⅛" and nearly wrecking the mechanism of the press.

The chagrined operators made haste to dispose of what they thought was a worthless product, and to remove all evidence of their inattention to duty. However, some small fragments of this super pressed board reached Mr. Mason's desk. The culprit crew were

severely lectured and fired on the spot. Some days later, after Mr. Mason had studied the broken pieces he came to the conclusion that this super dense board would make an excellent roofing tile, and hardboard was born! The disgraced crew was called back, each man being given a generous bonus check. Some changes were required in the presses, but the new hardboard was soon in production. Consequently hardboard was the result of a careless accident, and not a product developed by research! So runs the story!

It was only natural that this new product was covered by patents and extensive litigation finally established the validity of the basic Masonite patents, the last of which did not expire until 1951. All Masonite boards were made of waste chips, which were bought from adjacent sawmills for a song. Raw material costs were negligible, but the impact of the patent suit and the attendant damages were a severe damper on other developments for converting waste chips into sheeted products.

In the late 1940's, when the expiration of this patent was in sight, the Plywood Research Foundation, sponsored by Douglas Fir Plywood Association members, started work on a program to convert wood waste into a board that would be useful in the plywood industry. How far the original Masonite technique was modified during the life of the patent, and to what extent it was changed in the P.R.F. development are not important here, but the new and old hardboard are very similar in appearance and utility. The end result of this was a "reborn" hardboard, which would not only utilize the waste of these veneer and plywood


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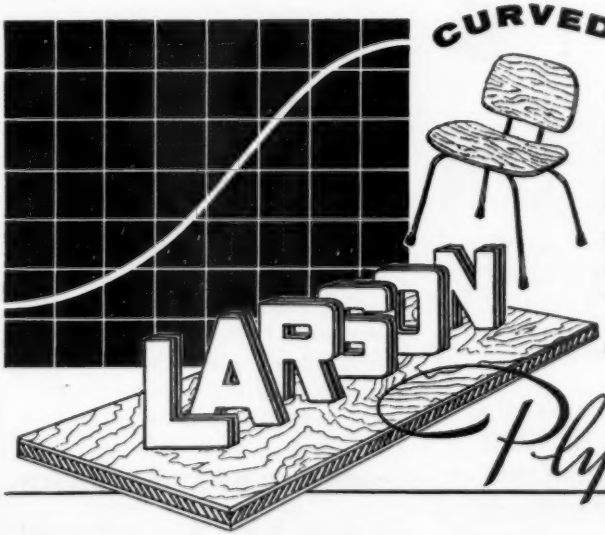


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mills, but the new product would contribute to a better fir plywood and overcome some of the existing handicaps.

Thus it comes about that hardboard, which can be a local recovery of inevitable waste, becomes a useful and profitable item in making a new type of Douglas fir plywood. Plyron is Douglas fir plywood with extremely hard faces, suitable for severe service, where normal plywood would be entirely inadequate. These outer hardboard layers are assembled with the veneer when the plywood is made, using the same hot press technique. There was no need to change the gluing or trimming processes, except to eliminate the sanding. These hardboard layers are 1/10″ and ⅛″ thick, and both the hardboard itself and its assembly into plywood qualify under the specifications for the EXTERIOR TYPE.

Nor is there any change required by users, since Plyron can be handled, cut, machined and nailed and in every way manipulated according to standard plywood procedures. The result is a special plywood of remarkable durability and versatility, which reveals new and otherwise unattainable applications in broader and broader fields of usefulness.

An example of the use of plyron is illustrated in Fig. 8. Space does not allow the enumeration of many plyron applications that have been made, but most of them have been mentioned above. Plyron will meet them all and add a denseness and durability that none of the others possess. It is available at plywood warehouses in standard sizes and thicknesses, including the

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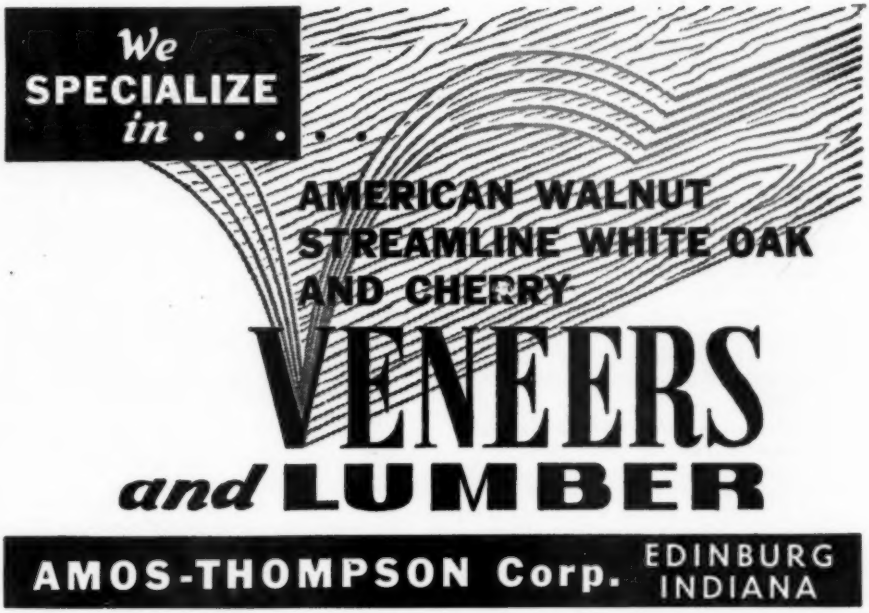


1/8" hardboard thickness in the nominal plywood dimensions. As an example, 3/8" Plyron would consist of a 3/8" plywood center, with two 1/8" hardboard faces.

This closes the series of twelve articles on "Plywood is Better," the publication of which started in September 1954. There has been no intention to take issue with those that prefer solid wood, for any reason whatever. Instead there has been a sincere attempt to demonstrate that, in many applications, plywood does a better job than solid wood, and is available in many forms and types for those who prefer to use it.

The co-operation of the Douglas Fir Plywood Association and of the United States Plywood Corporation are gratefully acknowledged in supplying data, sketches and photographs for this article.

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# New Techniques

Members of the American Walnut Manufacturers Association met at the U.S. Forest Products Laboratory recently to watch demonstrations of the Laboratory's latest developments in the cutting and drying of veneer.

Highlight of the meeting was a demonstration of the use of special instruments developed by the Laboratory to replace rule-of-thumb methods of setting the angle of the knife and the horizontal opening between the knife edge and the nosebar on a veneer lathe or slicer.

By using these instruments, even a comparative novice can make accurate adjustments on the lathe or slicer, and if he keeps records of the settings that give good results with certain types of veneer, he will soon be cutting good veneer consistently, according to Dr. H. O. Fleischer, in charge of the Laboratory's veneer research.

Both instruments are relatively easy to make, and the parts for each can be purchased for less than $25. The knife-angle indicator consists of a precision level and a protractor. The short arm of the protractor ends in a flat plate designed to fit against the ground surface of the knife. The level is attached to the longer arm of the protractor.

In use, the longer arm is adjusted until it is level, and the angle at which the knife stands is read to a fraction of a degree on the vernier scale of the protractor. If the knife is to be set at a predetermined angle, the protractor is set at that angle. Then the instrument is placed against the knife, and the carriage is tilted until the proper setting is made.

The horizontal opening between the knife edge and the nosebar is adjusted by use of a specially mounted dial gage, the stem of which projects above the knife edge until it contacts the edge of the nosebar. The gage then shows the magnitude of the opening between the knife and nosebar. Once the instrument is worked across the knife, the alignment will usually be perfect from end to end.

J. J. Egan, Kentucky Veneer Works, summed up the opinion of the Association visitors.

"It doesn't make any difference how experienced the machine operator is, there comes a time when he gets into trouble for some reason or other, and he just can't get back. If he had some

*Association members look on as Dr. H. O. Fleischer demonstrates the use of instruments for setting the angle of the knife and the horizontal opening between the knife edge and the nosebar.*

*Dr. H. O. Fleischer (left center), Forest Products Laboratory research specialist, explains how two 8' flitches of walnut were heated to a temperature of 160° F. in 12 minutes. The current is carried to the flitches by thin, flexible conductors attached to electrodes that transmit power to the wood. The wood serves as an electric heating element by virtue of the fact that it possesses resistance.*

standards, such as the instruments demonstrated by Dr. Fleischer, they would help him correct his trouble. Instruments of this kind will take a lot of the uncertainties out of veneer cutting," Egan said.

The Association members were also shown the Laboratory method of softening veneer logs for cutting by heating them electrically instead of in water or in steam.

In the demonstration, the Laboratory veneer specialists heated two 8' flitches of walnut, each about 14" by 7" in cross section, in 12 minutes at a total consumption of 7½ kilowatt hours.

These flitches were then cut on the slicer and the veneer was compared to veneer sliced from flitches that had been soaked in hot water for 2½ days.

The electrically heated veneer was smooth, firm, and of uniform thickness. In general, it compared favorably to the water-soaked veneer, but there was some variation in color.

Much of the work on electric heating is still in the experimental stage. In fact, only recently has the Laboratory tried to heat walnut by this method, but there have been very favorable results in tests with yellow birch, oak, water tupelo, and other species, Fleischer reported.

"We will continue to study the many variables that affect the rate of heating, and we plan additional work to determine the effect of electric heating on end checks, ease of cutting, color, and other properties," Fleischer said.

A third phase of the Laboratory's research was of especial interest to the visitors, according to C. C. White, secretary-manager of the Association.

"We were pleased to find the Laboratory conducting more or less fundamental studies of veneer drying. If we had as much information about the drying of veneer as we have on the kiln drying of lumber, we could probably reduce degrade and generally produce a better product," White said.

This comment was in response to Fleischer's description of current Laboratory work in veneer drying, which includes conditioning the veneer in the drier to improve moisture uniformity and reduce drying stresses.

"Although we realize Dr. Fleischer's work is preliminary, it seems to hold great promise. If the theory proves feasible on a commercial basis, it should be possible to reduce many drying defects and cut drying time, which would be a tremendous achievement," White said.

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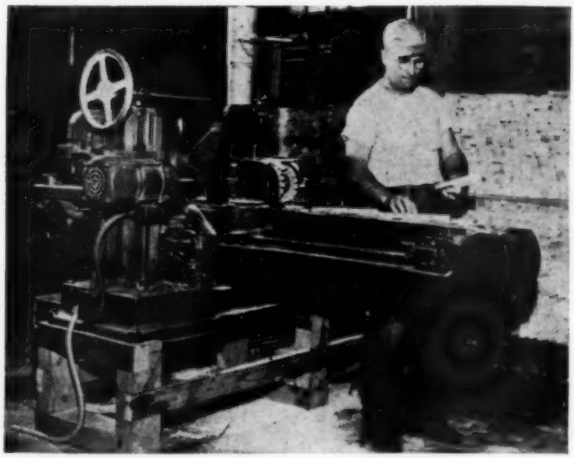

A new Bench Type Saw, capable of a wide range of operations, yet only 44" high, was shown for the first time at the NAFM Show, August 28, by Jenkins Woodworking Machinery Division, Curt G. Joa, Inc., Sheboygan Falls, Wis.

The new machine, called the Jenkins continuous feed double end bench type saw, is a low cost unit designed to perform a multitude of single and double-station operations which ordinarily are not profitable to perform on larger, more expensive machines. It will accomplish such jobs as: dado and groove, dovetail and miter, rout and face, shiplap and size, angle cut and slot, end shape, and others.

The Jenkins continuous feed double end bench type saw requires little floor space, and can be installed convenient to the work performed to minimize handling costs. Only 44" high it is capable of handling stock up to 24" wide, 108" long, 4" thick, and is equipped with 2-5 h.p. saw motors, one 2-5 h.p. dado motor, and a ½ h. p. feed shaft motor with speeds of 25 to 50 feet per minute. Further details may be obtained from the manufacturer, Jenkins Woodworking Machinery Division, Curt G. Joa, Inc., Dept. 2, Sheboygan Falls, Wisconsin.

**Read Pointed Paragraphs, page 40, for dates on fall conventions.**

## SHARPENER FOR JOINTER

The Foster portable jointer blade sharpener can be used without removing blades from the head. Setup and down-time are reduced because blades are not removed. The tool can be used on any size jointer.

There are no intricate jigs or fixtures necessary with the sharpener, available from Foster Supplies Co., Dept. WD, 61228 N. Milwaukee Ave., Chicago, Ill. The sharpener slides over the table; has positive index stop and locking device. Amount of cut is determined by raising or lowering the table.

## HAND MITRE

Woodworkers' Tool Works, 220 S. Jefferson St., Chicago, Ill., is offering this lightweight hand mitre. Cuts can be made accurately with either right or left hand. The tool is made of crucible hollow ground and heat treated knife steel and mitres both soft and hard woods. The tool can easily be adjusted to any choice of angle.

## BUSS DEVELOPS SEMI-AUTOMATIC CONTROL OF PLANER OUTFEED ROLL

The Buss Machine Works, Holland, Mich., have recently announced the development and incorporation into several models of their planers of a semi-automatic device for instantly and micrometrically adjusting the height of the top outfeed roll. By so doing, the manufacturers claim, they have made it both possible and easy to eliminate one of the major causes of planer marking. In addition to the elimination of planer marking it is said that the correct setting of the top outfeed roll, as provided by this Buss development, facilitates feeding material through the machine.

As pointed out by Buss officials, authorities on planing have long contended that the best height setting of the top outfeed roll was approximately 1/64" below the cutting circle. Repeated grinding of the knives, however, tends to alter this relationship, as does the adjustment of the lower roll, with the result that far too much tension on the stock often is created and marking occurs.

The device is located at the rear of the machine and consists of a con-

venient handwheel made integral with a graduated dial, the dial passing a pointer as the handwheel is revolved in either direction, to raise or lower the roll, as need may appear. An arrow is placed on the back of the machine, showing which way to turn the handwheel to lift the roll.

### GRAPHITE COATED CANVAS

This picture shows graphite coated canvas in use on a sander manufactured by the Curtis Machine Company. Graphite coated canvas is a product of the Process Engineering Corp., 458 Virginia Ave., Crystal Lake, Ill. The canvas is available in widths from 4" to 36" and graphite coated 2-ply belting can be had in widths from 6" to 26".

Value of the material lies in its ability to act as a lubricant against the back of the sanding belt, lessening friction, reducing heat, speeding up operations and cutting the cost of sanding because the belt will wear longer. It is used on hand block sanders, automatic and semi-automatic stroke sanders, endless belt, edge belt, drawer and chair back sanders. The 2-ply belting is especially good for drawer and edge sanding.

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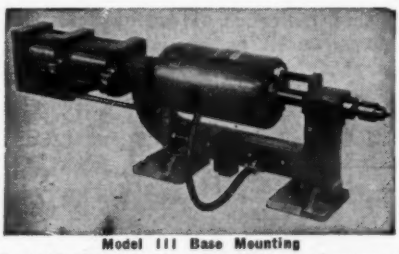
The optimist is often as wrong as the pessimist—but he has a lot of fun.

Model 111 Base Mounting

*Speed Production with . . .*

**NEW • IMPROVED IN-LINE AUTOMATIC**

**DRILL UNIT**

*For pilot and shank holes, for screws, dowel and wire holes, etc.*

**BY ELECTRO-MECHANO CO.**

In 1947, E-M introduced its first semi-automatic production drill unit. Thousands have successfully been used to solve simple and complex drilling jobs, etc. Now E-M proudly presents a New Line of compact self-contained air feed variable spindle speed drill heads featuring: IN-LINE design of pneumatic feed hydraulic control, electric motor and spindle. All side pull on spindle has been eliminated. Air and oil are separate; oil sealed in closed circuit. Push-Button or automatic electric control—rapid advance to work—Adjustable feed thru work—Automatic return and cycling.

**CAPACITY ¼"—STROKE 1½"**
**R.P.M. 1000—10,000 2500—15,000**

**PRICES—Ready to Drill:**
**COLUMN MOUNT $295.00, PAD MOUNT $315.00**
**VALVE-RELAY $42.50**

*Write for Literature and Name of Nearest Dealer*

**The ELECTRO - MECHANO Co.**
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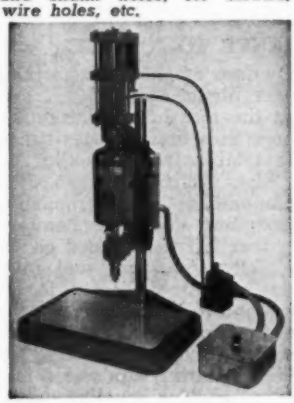
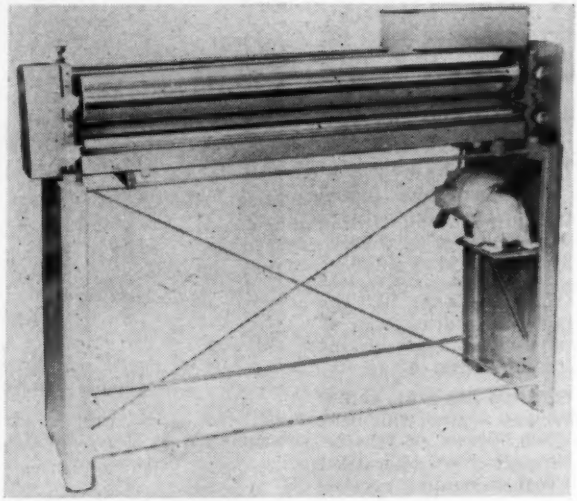


Model 110 with Valve and Relay

## WALCO SPREADER



Model 54-E-2, Walco Coater-Spreader, a new development having both doctor rolls on the feeding side, bottom spreader roll running in a reservoir, with top rolls fed with a three gallon tank. This machine is capable of coating one or both sides, top or bottom at the rate of 58′ per minute.

Rolls of a hard durable Hycar rubber and grooved according to requirements. Available in widths from 10″ to 72″. A fine machine for flush doors, cabinets, table tops, etc.

Also available with smooth rolls for filler coats, varnish and many other coating materials. This machine may also be used as an impregnator for glass cloth, plastic sheeting, and for coating honeycomb materials.

Made by L. R. Wallace & Co., 191 N. Pasadena Avenue, Pasadena 3, Calif.

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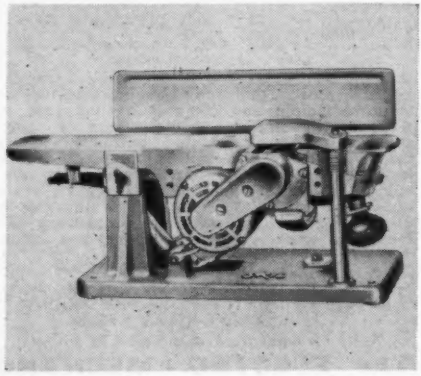
## PLANER TO JOINTER



Owners of the Skil portable electric power plane, Model 100, can now convert the tool into a stationary jointer-planer in a few minutes time. The tool is available from the Skil Corp., 5033 N. Elston Ave., Chicago, Ill.

Conversion is accomplished with a new plane stand of heavy cast iron construction just placed on the market by Skil's industrial tool division. The plane can be locked into position on the stand for fine finish work in cabinet making and small piece work. It can also be used for finishing rough surfaces, squaring up work for accurate joining and for beveling edges.

The plane gives a full 3″ cut, adjustable in depth from zero to ⅛″. Cutters are powered by universal motor at

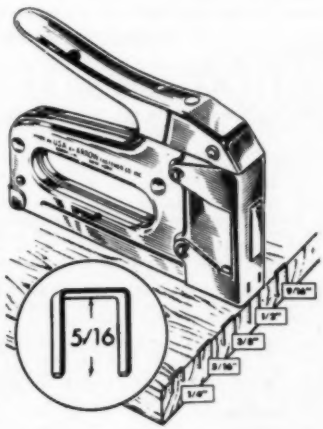
13,500 rpm for 27,000 cuts per minute. When used as a portable tool, bevel guide is easily removed for surface planing jobs. When bevel guide is used on tool, either in portable or jointer-planer application, it adjusts to a full 45 degrees, right or left.

## NEW LENGTH STAPLE

Arrow Fastener Company, Inc., manufacturer of stapling products, has added a 5/16" leg length staple size to their line of No. T-50 gun tacker staples.

The manufacturer claims that many applications require a specific size staple for best results and using a longer leg staple than is necessary may not drive the staple home flush. Thickness of material should be measured allowing approximately 3/16" for penetrating wood. This precaution will insure satisfactory results.

The addition of the 5/16" staple size now makes available five (5) sizes: ¼", 5/16", ⅜", ½", and 9/16". This wider range of staple sizes will fit most every nailing application.

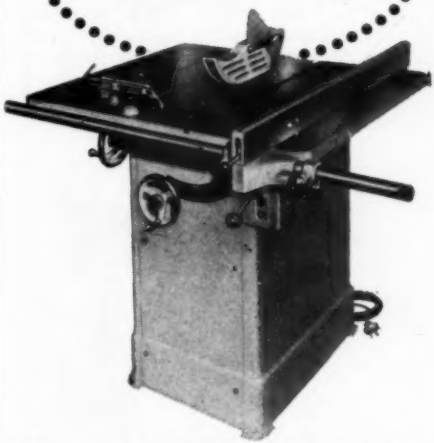



Further information can be obtained by writing manufacturer: Arrow Fastener Company, Inc., 1 Junius St., Brooklyn, N.Y.


new

heavy duty

10" TILTING ARBOR SAW



**SAFE . . . ACCURATE . . . POWERFUL**

Big, rugged, safe, powerful, precision machined for utmost accuracy. Check these features: Operates from 1 or 1½ H.P. motor . . . has 3 belt drive utilizing full motor power . . . extra heavy trunions for rigidity . . . large ground and polished table top . . . improved front and rear locking rip fence . . . tubular guide bars increase table capacity to 44½" . . . graduated scale on front bar . . . blade tilting and raising wheels lock securely . . . specially designed mitre slot "holds" gauge and prevents accidental dropping . . . snap-out base panel for sawdust removal, plus others.

SPECIFICATIONS: *Table top 33"x38" with ext.; depth of cut 3¼"; at 45°—2-7/16"; ⅝" spindle mounted on sealed ball bearings; standard equipment includes: deluxe mitre gauge, throat insert, rip fence, comb. blade, guard, splitter, anti-kick back, switch bracket, motor pulley and V-belts only* $320.

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giving complete details on saw and other power tools in the vast Duro line.

**DURO METAL PRODUCTS CO.**

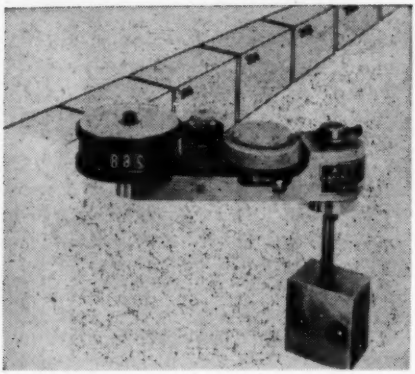
2685 N. Kildare Ave. Chicago 39, Ill.

World's largest manufacturers of Power & Hand Tools (Duro Chrome)

## AUTOMATION IN MARKING DEVICES

Engineered of heavy gauge steel for high-speed precision operation, the Krengel rotary coder automatically prints names, dates, codes, or other identification. Powered by a friction roller attachment, the rotary coder imprints on boxes, cartons, packages, cases, any kind of surface.

The Krengel rotary coder is completely automatic; affix the rubber type or die that will reproduce the imprint wanted, and the device is ready to operate.



Full information about automation in marking devices and the rotary coder are available from the manufacturer, Krengel Manufacturing Co., Inc., 227 Fulton Street, New York 7, New York.

## NEW DECALS

Manufacturers of juvenile furniture will be interested in a new series of stock decal designs just released by the Meyercord Co. The new series is said to be ideal for decorating toy chair backs such as doll chairs, small rocking chairs and some toys. The decoration is a strip measuring 2" by 6" and consists of three nursery rhyme characters. Each design carries its own clear lacquer so that the three items may be spread out to accommodate varying sized areas.

For samples and full information write to The Meyercord Co., 5323 West Lake Street, Chicago 44, Illinois.


EVERY DAY from COAST to COAST

**DODDS Dovetailer Bits**

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*Superiority*

Clean cuts—longer life under continuous hard use is exactly what you can expect when you use Dodds Dovetail Bits.

Precision made of special carbon steel—each Dodds Bit individually hand finished by expert craftsmen—your guarantee of the finest in bits.

There is a Dodds Dovetail Bit for every size dovetail. Immediate delivery from stock. Special bits made to order. We have a complete Dovetail Bit service.

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**Surplus Tempered Steel**

**CIRCULAR SAW BLADES**

**Cross Cut • Rip • Combination** Reg. to $4.95 ea. (plus 20c for each blade to cover P.P. and handling) **99c ea.**

Not just ordinary, imported blades, but first quality heavy gauge tempered tool steel blades designed especially for long rugged use, and made right here in America. Available in 6", 7" and 8" diameter with ½" and ⅝" bores to fit all popular makes of hand, power and table saws.

Will fit: SKIL, SHOPSMITH, STANLEY, BLACK & DECKER, MALL, DELTA, DEWALT, CRAFTSMAN and most other equipment.

**4"** RIP, CROSS CUT, or COMBINATION —⅜", ½" bore. Reg. $1.50 NOW ppd. **59c**

**5"** RIP, CROSS CUT, or COMBINATION with ⅝" bore only. Reg. $2.25 NOW plus 20c handling **79c**

**10"** RIP, CROSS CUT, or COMBINATION—⅝", ¾" bore. OUR PRICE Reg. $5.50 **$1.59** ppd.

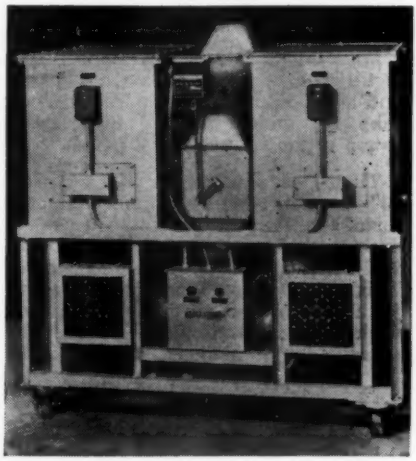
When ordering specify equipment name, blade and bore size. Send check or M.O., C.O.D. charges extra. MONEY BACK GUARANTEE.

**SCOTT-MITCHELL HOUSE, INC.**

**Dept. SB-25, 611 Broadway, N.Y. 12, N.Y.**

## DRYOMATIC DEHUMIDIFIER

Development of a new absorption type, heavy duty dehumidifier suitable for use in factories, warehouses, storage vaults and other large areas where controlled humidity is desired was recently



announced by the Dryomatic Corporation of Alexandria, Virginia.

The Dryomatic T-150 is an automatically regulated dual-tower unit, using silica gel as the drying agent. It is designed to maintain humidities as low as 10% in areas up to 60,000 cubic feet over a wide range of temperatures. The machine has a dry air output of 150 cubic feet per minute and is capable of removing four to five lbs. of water per hour. The regeneration of the silica gel is accomplished automatically by electric heating elements.

The unit requires only standard electrical outlets and a minimum of duct work. It is compact and can be mounted on casters for easy relocation. Built-in or remote humidistat control can be provided for completely automatic on-off operation.

## KNIFE GRINDER

Samuel C. Rogers Co., 191 Dutton Ave., Buffalo, N.Y., is offering the light duty "NT Junior" knife grinder. The

**DRYALATOR**
Wood and Lumber Dryer

**DRIES** ANY SPECIES **BETTER**

**1/5 THE TIME**
**1/4 THE SPACE**
**1/3 THE PRICE**

**Some Prominent Installations**

2 Dryalators
L. C. ANDREW CO.
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3 Dryalators
J. C. ADAMS
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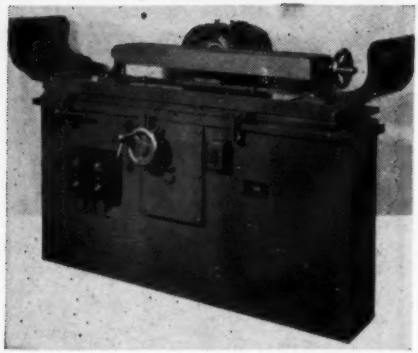
1 Dryalator
JAMESTOWN LOUNGE CO.
Jamestown, N. Y.

*Literature and Dealers on Request*

**LUMBER DRYALATORS, INC.**
Dept. WD, 31 Milk St. Boston, Mass.

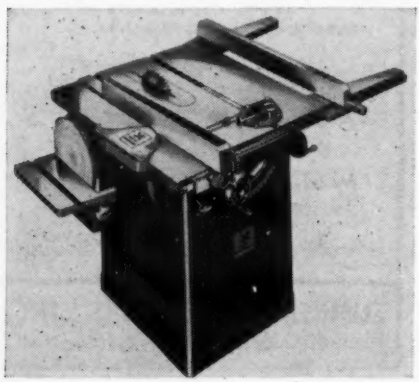


machine is used for precision grinding of woodworking straight knives.

The grinder has a reversing motor. A swiveling type knife bar with two faces is fitted by trunions to the table. One knife face is used for narrow, thin knives and the other face is for thick, wide knives. An index is included to allow for easy setup for bevel grinding to any desired angle. The knife table moves in a combination of machined, self-aligning "V" and flat bed ways.

## YATES-AMERICAN INTRODUCES NEW TOOL

At a special presentation in midsummer, the Yates-American Machine Company, Beloit, Wis., introduced its single-unit, multi-purpose machine. It is a combination saw-jointer-sander,



self-contained in a table-top cabinet. To change the Y-A machine from a saw to a jointer to a sander, it is necessary to simply turn a wheel. The conversion is complete, automatic and instantaneous. When one tool is "up" and in operating position, the others are automatically "down."

Mechanically, the unit consists of an 8" tilting arbor circular saw, a 4" jointer and a 10" disc sander. The machine can take 14" width material and is able to rip to the center of a 4' panel.

This Y-A machine is 33" wide and 33" deep, has a convenient and comfortable "working height" of 34". A special feature of this multi-purpose tool is the "feather-touch" rip fence. This ball bearing fence can be moved with pressure of a feather, doing away with time-consuming and cumbersome micrometer adjustment.

## NEW CORE STOCK

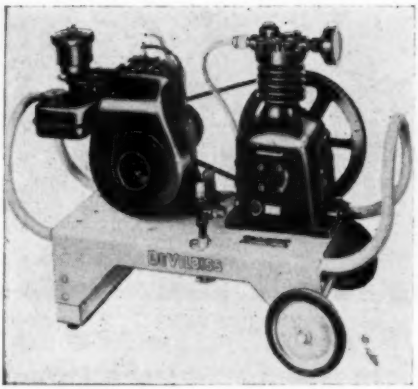
The Illinois Fibre Specialty Co., 4800 S. Hoyne Ave., Chicago 9, Ill., has available a new core stock for desk tops and store fixtures. It can be obtained in thicknesses of ¾", 1" and 1¼". This board has a hardboard facing on two sides of a chipboard composition. Veneer facings and plastic laminates can be adhered to this core stock.

## NEW AIR COMPRESSOR

Plenty of air to do your work wherever it may be describes the newest air compressor being made by the DeVilbiss Company, spray painting equipment manufacturer, Toledo, Ohio.

The compressor, carrying the designation PJE-521 when powered by a gasoline engine and PJ-521 when electric motor driven, is a compact, portable unit.

The unit, rated at ½ horsepower, will deliver air at the right pressure for spray painting and other low pressure uses. Thoroughly tested in the laboratory and in the field, the PJ line has proved its durability and dependability.

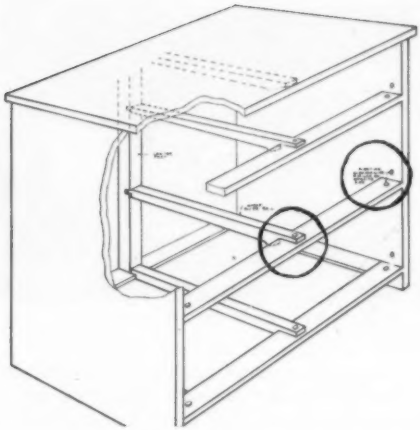


DeVilbiss engineers have designed the air reservoir and condensation chamber to serve also as carrying handles for the relatively light-weight unit.

The compressor is of upright single cylinder design with the cylinder block and the crankcase cast as one integral unit. The deeply-finned cylinder area and flywheel, which supplies a blast of air, together assure cool running, thereby reducing compressor wear and assuring efficient operation.

## DRAWER MOUNTING SYSTEM

Furniture manufacturers may utilize the Bissman patented system on a franchise basis. Drawers installed by this system float on rubber-cushioned metal glides and saddles. The Bissman patented system, says the manufacturer, makes jamming and binding virtually impossible.

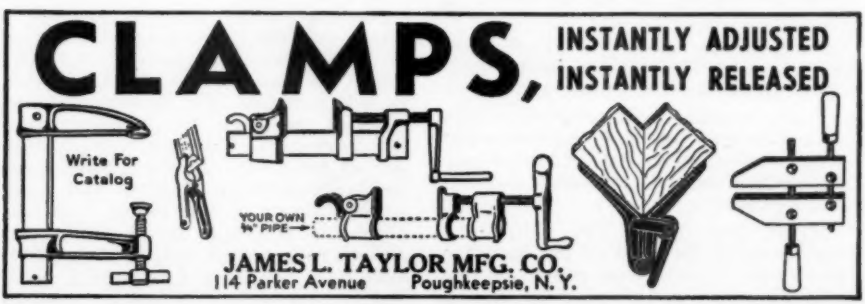


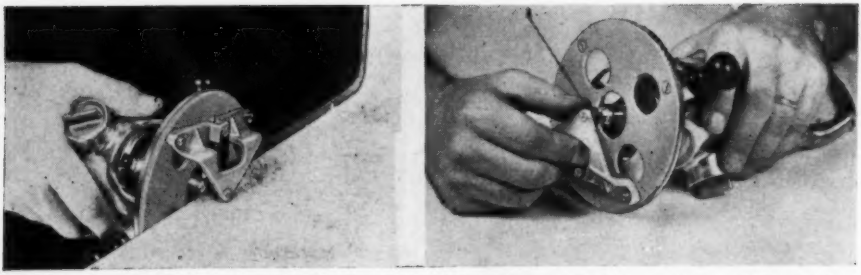
Keynote to the system is the hardware used—a combination of rubber and metal on glides and saddle provide the silent, smooth action of a ball bearing system. The drawers are mounted on a 3-point suspension plan. The diagram shows locations where the glides are installed.

Bissman offers to revamp anyone's case to their system without any cost or obligation. Write Bissman Research & Designers, Inc., Springfield, Mo., for further information.

## ROUTER KIT

A router kit that offers double-feature advantages in trimming veneers, decorative laminates and other hard



*Right: router kit's nylon collar and double-feature bit in action. Left: Nylon collar is shown as A.*

plastic surfacings has been announced by the Stanley Electric Tools Division, the Stanley Works, New Britain, Conn.

The new trimmer's outstanding features are (1) a single bit for either flush or bevel trim, which allows the operator to save as much as an hour a day in setup time; and (2) the bit's small diameter, which insures fracture-free trimming.

Thumb-and-forefinger adjustment of a nylon collar in the underguide enables the operator to select either the straight edge of the bit for flush work or the angled edge for a bevel trim. Specially hardened tungsten carbide makes the cutting tool stay sharp.

---

**AUTOMATION—IS IT REALLY NEW?**

"The Adventures of Ripp Vann Twinkle," a 16-page booklet on automation, explains in easy-to-understand words and pictures that automation is nothing new. It merely means "increased industrial productivity," and has been around and in use in some form for centuries, even though the word itself is new to many people. The booklet helps an employee see the importance of automation to his company in keeping up with and ahead of competition, to insure his job and the future of his company.

Produced for employee distribution; available now from Enterprise Publications, 11 N. Wacker Drive, Chicago 6.

In the booklet, our modern Ripp, like his famed predecessor, falls asleep—just after reading some hair-raising news: Automation here! Automation factories to take over!!

Ripp's first dream takes him back 2000 years to the time of the Egyptian water carriers, who were convinced that unemployment would result when pipes were laid to bring water to the city. But even in his dream Ripp remembers that today plumbers and people employed in making plumbing fixtures outnumber the water carriers of pre-plumbing days by many thousands.

**BRIQUETTE BOOKLET**

Of interest to woodworking plants who have an ample supply of wood refuse is a new 12-page booklet issued by Wood Briquettes, Inc., Lewiston, Idaho, on its Pres-to-logs stoker fuel machine.

Purpose of the unit is to turn a waste nuisance into a profitable manufacturing item—compressed fuel for use in domestic and commercial stokers, in small chunks 1⅛" in diameter and from ¾" to 1" in length. Capacity of the machine is approximately 12 tons per 24 hour day, the fuel being made from dry sawdust, shavings and chips.

Illustrations of the stoker fuel machine are shown in cross section, together with actual installation; operation is explained and necessary auxiliary equipment described.

## PAINT SCHOOLS

Anyone connected with, or interested in, the industrial application of paint and coatings is invited to attend the Binks Manufacturing Company's free School of Spray Painting. Students are instructed in the proper use of the latest in spray painting equipment and learn how to get the best results from present installations.

The one-week courses for the final 1955 quarter will be held at the Company's main plant in Chicago on the following dates: October 3 through October 7; November 7 through November 11; and December 5 through December 9.

## FALL MEETING OF WOOD SEASONING ASSOCIATION

The Midwest Wood Seasoning Association will hold its fall meeting at the Lowell Inn in Stillwater, Minnesota on September 29 & 30.

Highlights of the program will include: (1) Field trips to Andersen Corporation in Bayport and Twin City Hardwood Lumber Company in St. Paul, (2) Technical papers presented by Frank Kaufert of the University of Minnesota, Willard E. Pratt of the California Redwood Association and E. F. Rasmussen of the Forest Products Laboratory, (3) A "Problem Clinic" with emphasis on kiln operation moderated by Russ Carlson of Paine Lumber Company, and (4) a boat trip on the St. Croix river and cocktails and dinner.

The purpose of the association is to promote and improve seasoning, storage, handling, and use of wood through the exchange of ideas and discussion of problems. Membership is open to all persons interested in wood seasoning—kiln operators, foremen, plant superintendents, and management personnel.

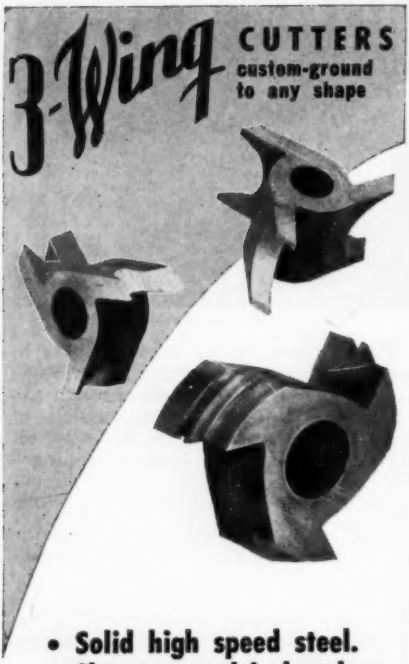
Any one interested in membership in the Midwest Wood Seasoning Association or in attending the meeting on September 29 & 30 should contact the Secretary, Midwest Wood Seasoning Association, Room 820, 332 South Michigan Avenue, Chicago 4, Illinois.

## FLOORING GROUP MEETS

The National Oak Flooring Manufacturer's Association, which credits its hard-hitting advertising and publicity programs for much of hardwood flooring's record demand this year, has taken out "promotion insurance" for the future.

At its annual mid-summer meeting in Memphis, Tenn., the group approved a 25% increase in the regular assessment which members pay into the organization's promotional fund.

Demand for oak flooring reached an all-time high in 1954, and shipments in the first half of this year topped those in the similar 1954 period by about 20 per cent. All the evidence points to increased popularity of oak floors, a wholesome development which can be attributed in no small degree to the association's effective advertising and publicity.




- **Solid high speed steel.**
- **Shape ground in bevel or form relieved.**
- **All cutting surfaces and sides finished ground.**
- **Bore sizes from ½" dia. up.**
- **Prompt delivery.**
- **Carbide tipped cutters quoted upon request.**

Prompt sharpening service available. Price list on 3 Wing Cutters furnished upon request.

*Dealer inquiries invited.*

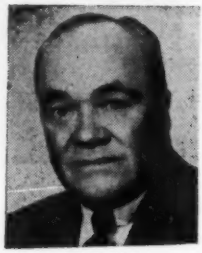
Send for complete price list on other knives for the woodworking industry.

**CHARLES G. G. SCHMIDT & CO., INC.**
403-405 BROOME ST., NEW YORK 13, N.Y.


## Appointments

Election of **E. P. Allis**, president of the Louis Allis Company, to the post of chairman of the board and promotion of **John W. Allis** from vice-president to president, has been announced.

*J. W. Allis*



*E. P. Allis*

**Larry T. Marshall** of Arcata, Calif., has been named manager of M and M Wood Working Company's California Timber Division.

*Wiesen*

*Meister*

Atkins Saw Division announces the election of three officers: **Carl J. Meister** has been elected executive vice-president; **Howard O. Wiesen**, vice-president of administration and **Robert M. Zimmerman** has been made vice-president of manufacturing.

*Zimmerman*

*Frifield*

**Don R. Frifield,** former promotion manager for the National Association of Radio and Television Broadcasters, has

been made assistant secretary of the Wood Office Furniture Institute.

Behr Manning has promoted two men in the woodworking field. **J. Kenneth Stephens** has been made manager of industrial trades in the company's High Point division. **Harvey L. Bennett** assumes the new post of national products engineer to the woodworking industry. He will be in High Point for a time before transferring his headquarters to Troy, N.Y.

*Harvey L. Bennett*

*J. Kenneth Stephens*

Three organizational changes in the Wood Preserving Division of Koppers Company, Inc., have been announced. **R. H. Devine**, formerly assistant sales manager, has been appointed assistant manager, eastern district. **J. W. Sullivan** is now assistant sales manager of the Wood Preserving Division. Also announced is the elimination of the Colorado district. This has been integrated with the Texarkana district under the supervision of **S. S. Curtis.**

**Theodore Lazaraton** has been appointed controller for James B. Day & Co., paint, varnish and lacquer manufacturer of Chicago.

**JAMES DAY**

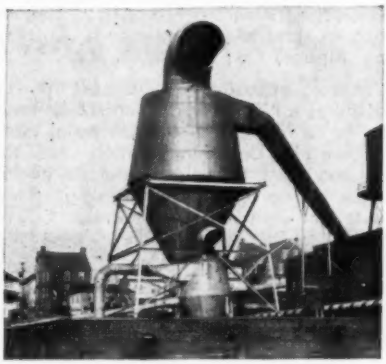
James B. Day, Jr., 48, passed away suddenly on July 23rd while vacationing with his family in Wisconsin. Cause of death was Coronary Thrombosis.

He is survived by his widow, Audree, daughter, Dale, son, James, Mother, Elizabeth, Brother, Arthur and Sister, Dorothy Day Stritt.

He was Secretary and Sales Representative of James B. Day & Co., Chicago, Paint, Varnish and Lacquer Manufacturers.


# DIXIE takes the *DUST* out of INDUSTRY

Dust cuts profits; DIXIE controls dust . . . efficiently, safely and economically. If *your* woodworking plant suffers from dust-sabotage, consult a DIXIE engineer for expert direction, at no obligation.



Large cyclone collector is part of Dixie Installation at Red Lion Furniture Co., Red Lion, Pa.

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**FREE BOOK**

Dixie Booklet 47b "DUST COLLECTORS" contains valuable data and charts to guide you in determining the requirements for adequate dust removal in your plant. Write for it today . . . it's FREE.

## KITCHEN CABINET ASSOCIATION

A new trade association in the wood industry—the National Institute of Wood Kitchen Cabinets—was formally organized at a meeting in Chicago July 30 attended by representatives of 18 companies.

A permanent board of directors was elected and constitution and by laws were approved. President of the institute is Richard Chapman, Mutschler Brothers Co., Nappanee, Ind. Hugh Gregg of Gregg & Son, Inc., Farmingham, Mass., was named first vice-president and Ivan H. Ramsey, Curtis Companies, Inc., Clinton, Ia., was chosen as second vice-president. Secretary is E. C. Hawkinson, Brammer Mfg. Co., Davenport, Ia., and treasurer is E. H. Courtenay, Mengel Co., Louisville, Ky.

The constitution establishes the institute as a non-profit organization having as its object the promotion of close cooperation between segments of the industry and the dissemination of information on the advantages of products made or sold by the members. The institute's office will be located in Chicago.

## SIMONDS EXPANDS

Arrangements have been made by Simonds Saw and Steel Company, Fitchburg, Massachusetts, to operate the manufacturing plant of Heller Brothers Company of Newcomerstown, Ohio, under the name of the Heller Tool Co., Subsidiary of Simonds Saw and Steel Company.

Well known in the general industrial, hardware, automotive and aircraft fields, Heller Brothers Company is one of the country's oldest manufacturers of Swiss pattern, milled curved tooth and rotary files as well as American pattern files and rasps. The addition of the Heller trademarked "Vixen", "American-Swiss" and "Nucut" (patented) files to the Simonds "Red Tang" line of American pattern files, rounds out and extends Simonds present line of files and increases the sales potential of the Simonds Company for all types of files.

## A.W.I. CONVENTION

The Architectural Woodwork Institute, trade association of the special millwork industry, will hold its Third Annual Convention at the LaSalle Hotel in Chicago on October 20-21, 1955.

The chief purpose of the Institute is to sell more wood and woodwork through its series of technical brochures which are sent to over 10,000 architects of members' choice throughout the United States and Canada. Brochures produced in 1954 have won two top awards, namely, the American Institute of Architects Certificate of Exceptional Merit, and the Wood Working Digest Plaque of Exceptional Merit.

## NEW TRADE ASSOCIATION

The organization of the American Wood Fabric Institute was announced recently by the manufacturers of woven wood fabric and woven wood window and porch blinds, shades and drapes and folding doors. The Institute's office will be in the Associations Building in Washington.

A program for use of AWFI quality certification trade marks will be announced shortly. A spokesman for the manufacturers reported: "AWFI will assist in the development of commercial standards which will assure the consumer of an American made quality product."

## UPSON ANNIVERSARY

Founded in 1910 by Charles A. and W. Harrison Upson, Jr. in Lockport, N.Y., the Upson Company, largest manufacturer of laminated wood fiber panels in the world is observing the 45th anniversary of its organization.

Upson pioneered in numerous firsts in the dry-built construction field and was the first to come out with a four-ply, kiln-dried, water-proofed, surface filled wallboard. The first board was marketed after two years of experimenting in producing a better type of product than was available 45 years ago.

To commemorate its 45th anniversary, a special edition of the Blue Center News, Upson employee magazine, was issued to which 19 veteran employees and former employees contributed personal recollections and early photographs.

## NEW BORDEN PLANT

The first plant to produce liquid urea, phenol and resorcinal formaldehyde resins in commercial quantities in Wisconsin will be opened in Browntown on Sept. 1 by the Borden Company's Chemical Division, according to an announcement by the company. Designed for initial production at the rate of more than a million pounds per month, the plant will supply adhesives to the wood industry and wet-strength resins to the paper industry in the midwestern area.

The plant will make deliveries of the resin by Borden-owned tank truck and by rail direct to furniture, plywood, millwork, packaging producers and paper mills in the area.

## BOSTITCH BREAKS GROUND

Ground was broken recently by Bostitch, Inc. for a new factory and headquarters in East Greenwich, R.I. Architectural engineers say this will be the largest one-story factory in New England. The new plant, where Bostitch will manufacture its largest line of staples and stapling equipment in the world, is scheduled for completion late in 1956. Bostitch equipment is widely used in the building, building materials and woodworking fields.

## WOODEN PALLET ASSOCIATION RECEIVES NATIONAL HONOR

National honors were conferred upon the National Wooden Pallet Manufacturers Association of Washington, D.C., by the American Trade Association Executives at their 35th Annual Meet-

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ing held at Mackinac Island, Michigan. One of the ATAE's Outstanding Activities Awards for 1955 was bestowed on the National Wooden Pallet Manufacturers Association in recognition of its progressive program.

The citation to NWPMA was for "outstanding service to the industry which it represents as well as to the American Public." It went on to state that amongst NWPMA's outstanding accomplishments were its publication of the Technical Handbook on Pallets and Palletization and its Minimum Standard Specifications for Warehouse Pallets, its drive for railroad rate concessions on palletized freight, and its public relations campaign.

**WILLIAMS & JENSEN FORM FIRM**

The new firm, a Florida corporation, will establish headquarters in Miami, and will continue operating its office at the Bank of South Haven Building, South Haven, Michigan. The company is organized to buy and sell for export, to provide export management, engineering, travel and technical services.

Mr. Williams is widely known in industrial circles here and abroad through his activities with the Minnesota Mining and Manufacturing Company of St. Paul, Minnesota.

Minnesota Mining, in 1951, sent Mr. Williams to Europe where he traveled England and the continent continuously until 1953, as manufacturing manager for coated abrasives. He supervised production of abrasives in all Minnesota's European plants. And he set up a technical sales program in the various West European countries.

Mr. Williams spent 1954 in Brazil, Mexico, and other Latin American countries, supervising production and sales for Minnesota Mining.

Mr. Jensen is well known in the export sales and advertising profession, both here and abroad. With 17 years experience in export sales and promotion, he has made more than a dozen trips abroad.


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Wood working plants, contractors, industrial users—here's your best buy in a production saw blade. Disston *Preferred* CIRCULAR SAWS cut with minimum power. That means not only faster sawing and less motor strain . . . but smoother finish wood surfaces.

These *Preferred* saws combine the latest developments in saw design with famous Disston saw steel. That combination means extra hours of production before resharpening and teeth that hold their set through the toughest, gummiest woods.

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HAS THE EDGE.

## PACKAGING GUIDE

The new Signode catalog has 44 pages of usable facts that help lower freight bills, end pilferage, reduce loss and damage claims, reduce container costs and speed packaging and shipping.

It shows how to apply strapping to containers, brace open top and closed freight carloads, barricade car doorways to protect all types of packaged and bulk commodities. Pictures show Signode's complete line of hand and power strapping tools and machines, strapping, seals and accessories.

Copy of "Packaging and Carloading Guide" available from Signode Steel Strapping Company, 2600 N. Western Ave., Chicago 47, Ill.

## MAUREY BELT CATALOG

The complete line of Maurey Mor-Grip fractional horsepower and heavy duty multiple V-Drive belts are described in a new 3-color, 24-page catalog just released by the manufacturer.

The multiple line is most complete and consists of super, steel cable, open end and hexagon V-belts as well as V-link belting. Each type of V-belt is completely described as to its construction and applications. The busy engineer who wants concise and complete information will welcome the Maurey catalog for his file. A copy of the catalog may be obtained by writing direct to the Maurey Manufacturing Corporation, 2907-23 South Wabash Avenue, Chicago 16, Ill.

## TWO NEW WALNUTS

The pioneer of decorative laminated plastics, The Formica Company, announces the addition of two new walnut patterns to their wood grain line.

The decorative sheets used in making these patterns are being printed by a new process—3 color, registered, gravure printing. Formica becomes the first laminated plastics manufacturer to use this process.

Officially introduced this summer through various trade exhibits participated in by The Formica Company, the manufacturer now has the two new walnuts ready for distribution and public acceptance. One is called "Autumn." The lighter walnut carries the name "Tawny."

The new gravure process results in a more natural looking larger figured wood. Random printing, which was formerly used on many wood grains, is quite satisfactory for small figured woods. However, in big figured grain it is necessary to superimpose each color in registration.

The new walnuts give the furniture manufacturer, the interior decorator, the contractor, and the fabricator that much greater selection.

## NU-PLY PLANT READY

Nu-Ply Corp., Bemidji, Minn., is nearing completion of its new plant. Elmendorf Research Inc., of Chicago, veteran of many years in the field of lumber and wood products, has developed Nu-Ply as an answer to conservation of natural resources. Nu-Ply is a veneered fiber board for interior applications. It is made of chipped northern pulpwood that is fiberized, mixed with a binder, veneered and hydraulically pressed, cured and stabilized in one operation.

Machinery and equipment was designed by the Industrial Development Company, Tacoma, Wash. and Mr. F. Russell Eggers, plant manager. The State of Minnesota through the Iron Range Resources & Rehabilitation Comm. and the Department of Administration has leased the state owned pilot plant to the Nu-Ply Corporation to experiment with and develop the new product for the purpose of expanding the markets for the state's natural resources and employment of labor.

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Folks can make monkeys of themselves by carrying tales.

# BE INFORMED ON WOOD GLUING

**Interested in glues and gluing? If so, your name should be on the mailing list of THE PERKINS GLUE LINE. This house organ of Perkins Glue Company is mailed free of cost or obligation to all who request it.**

**Recent issues of THE GLUE LINE have carried articles on a wide variety of subjects including: Glue Selection, Glue Handling & Storage, High Frequency, Moisture Content Detection, Moisture Control, Hardwood Plywood Imports and similar topics.**

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# Mechanics Through the Ages

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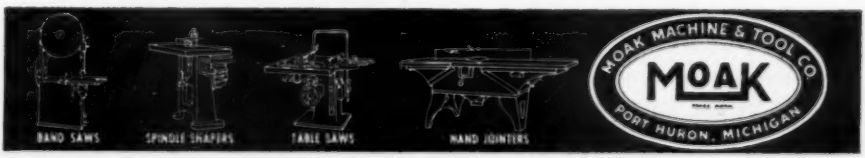

# The Market Place

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Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

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Air Compressors, various sizes
Band Saws, Amer. 42", Belted MD
Band Saw, Greenlee No. 410, 36" bb, dmd
Band Saw, New Delta 20" bb-dmd
Band Saw, F&E No. 50—36" bb v-belt & motor
Blowers, Garden City 55"
Borer, Andrews 3 spindle vertical bed
Borers, Greenlee No. 369—5' DMD.
Borers, Greenlee No. 370 6 ft. horiz. dmd
Borers, Moak SS 2 Spindle horiz. dmd
Borer, W&M 283-B, bb, dmd, single spindle
Boring & Sawing, McKnight 26F dmd
Carvers, Y-A (U9) BB, DMD.
Clamps, Handy No. 71 revolving
Clippers, Coe 88" bed and motor
Dovetailers, Dodds, 20 spindle
Dowel Driver, Bell No. 8
Frequency changers, 30 KW and 33 KW
Glue Jointer, Diehl No. 66 bb-dmd
Glue Jointer, Jenkins No. 343A bb-dmd
Glue Spreaders, 12" Black Bros. dmd
Jointers, Porter Type C—24" BB, DMD.
Jointers, Glue, Yates-American No. 213 bb-dmd
Jointers, New Moak 12" bb-dmd
Jointers, Porter 16" and 24" bb-dmd
Jointers, Yates No. 199, 12" bb. v-belt drive
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Mortiser, New Britain No. 7 bd & motor
Mortiser, W&M No. 238—5 spindle Horiz. dmd
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Moulders, Vonnegut 12" bb-dmd
Moulders, Yates-American C88, 8" bb-dmd
Moulders, Yates-American C-89—6" bb-dmd
Planers, Oliver No. 169, 30" double bb-dmd
Planer, Facing, Yates-American 36" with Jackson & Church feeder on base, bb-dmd
Planers, F&E—30" double, pb. bd & motors
Planers, Whitney No. 24—30" Dbl. BB, DMD.
Planers, Berlin 36" round head dmd
Planers, New Crescent 24" bb-dmd
Planer, F&E No. 156 36x7 dmd. round head
Planer-Matcher, Yates A1-15"x6" round heads pb. bd.
Redrier, Merritt 12 plate 36x72
Routers, Defiance single spindle high speed dmd
Sander, Yates No. 430, semi-stroke, bb-dmd
Sander, Yates No. 431—43" 3 drum endless dmd
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Sander, 48" double disc, dmd
Sanders, F&E 60" 3-drum roll feed, dmd
Sanders, McKnight single drum 24"x16" dmd
Sanders, Porter Cable vertical oscillating dmd. sgl. spdl.
Sander, W&M No. 171 belt bb., m.d.
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Saws, F&E No. 530, BB, DMD.
Saws, F&E No. 500 variety bb-dmd
Saws, Greenlee No. 493, variety, bb-dmd
Saws, Hermance Gang Rip, pb & motor
Eaglesfield Swing Cut-off Saw, BB, DMD.
Saws, New Delta-Crescent 12" tilting arbor dmd
Saws, New Multiplex 40A & 50A
Saws, Porter C-43, cutoff, bb-dmd. & tables
Shaper, Defiance double spindle, bb-dmd
Shaper, Whitney No. 389, double bb-dmd
Shapers, New Moak single spindle bb-dmd
Shapers, Greenlee No. 180 double bb-dmd
Shaper, Whitney double spindle, bb-dmd
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Tenon Heads, single and double end
Tenoner, Hayes 6 ft. double with copes, pb. bd. & motor

Many other items, send your inquiries

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Blower, exhaust, Sturtevant, with pipe
Matcher, Morgan 12 roll, plain bearing
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Case clamp, Union No. 1060, 27x48 plates
Moulder, Yates American C-88
Glue Clamp Carrier, Taylor 6½'

**DAVNER CORPORATION**
BOONE, IOWA

Bell No. 12 Air Operated Double Mitre
Greenlee No. 495 Tilt-Arbor Variety Saw
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Mattison Late Style 12" Electric Moulder.
Diehl-Vonnegut 12" Electric Moulder-latest.

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### Woodward Machinery Company
### 309 E. Second St. Cincinnati, 2, Ohio

Band Saw, Parks 22" M.D. $85
Belt sander, American, wide surface, belt, $125
Belt sanders, roll table hand block, real bargains, $150 and up.
Borer, Two spindle, vertical, M.D., $150
Borer, Bell gang, double end, dowel, $300
Dowel Pointer and Trimmer, Bell automatic, $300
Jointer, New 6 in. Bench, $45
Mortiser & Borer, American horiz., 5 hp, HC MD, $300
Planer, Single, 18 to 24", $175 and up
Ripsaw, Jenkins BB, heavy duty, straight line, $500
Sanders, Wysong & Miles edge belt, $100
Saw, Roll table cutoff, $75
Shaper, Wallace DMD BB single, $75
Swing Saw, Towsley DMD BB, $150
Tenoner, American No. 2-1-2 sgl. cope and mtr., $250
Variety saw, heavy duty, with jointer, MD., $175
Variety saw, heavy, tilting arbor, Fairbanks, $175
Numerous other machines

## FOR SALE

### A. C. Puckett Lumber Company
### 142 Madison Ave. Memphis 3, Tenn.

Air Compressor, DeVilbiss, 5 hp, used 2 mos. (1)
Band Resaw, 27 ft. Mershon
Blow Pipe system, Complete Jacksonville 21"
Burner, 30 ft. diameter 30 ft. high C&D Welding Co.
Circle resaw, J. A. Vance
End trim saws, 10" P.D. (2)
Drill press and grinder, Heavy Duty
Gang rip saw, Mereen Johnson Straight Line, No. 441
Gang rip saw, 18" DoAll
Knife grinder, Dependable
Moulder, SA Woods 9"
Planer, Baxter Whitney No. 32, Ball Bearing dir. dr.
Surfacer, Fay and Egan 30 in. single

All the above equipment is located at Popular Bluff, Mo. For further information contact our office at the above address.

## FOR SALE

### Clifton Machinery Co.
### 1623 W. 6th St. Cincinnati, Ohio

**Saw Dust and Shavings Mill Exhausters and Blowers—Hundreds in stock, sizes to suit any need. Also Air Compressors. Fans, Rotary Blowers, Money Savers—Send specifications.**

**All machines rebuilt and fully guaranteed.**

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### L. R. Kenner
### 3325 Trinity Road Louisville 6, Ky.

Borer, 48" Bell No. 205 horiz. multiple head
Cutter Grinder, Mattison No. 231 motor drive
Planer, 30" Whitney sgle. sq. head, with motor
Sander, 48" Smith No. 404 end. bed, BB, M.D.
Cut-off Saw, Diehl No. 88 Str. Line

### Ferro-Machinery Co.
### 155 King St. E. Toronto. Ont. Canada

**Complete line of European woodworking machines, up to date design, very attractive prices. Stock Toronto. Write for general catalogue.**

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## PRICED FOR QUICK SALE FROM STOCK

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30" American Swingout Feeder
12" H. B. Smith direct motor drive
**MORTISERS**—New Britain Chain No. 7
Fay & Egan No. 510 Hollow Chisel, like new
Greenlee No. 228 C.M.D. from motor
**TENONERS**—Fay & Egan No. 2 coupled drive motor upper-lower copes & C.O. 3HP
Jenkins Model No. 95 Double Bed
Jenkins Model No. 90 Double Bed
**LATHE**—Mattison No. 57-B 42" with a standard and hollow chuck feed
**MOULDERS**—Fay & Egan No. 22S—4" Childs 2"x4" Electric Moulder
Yates No. 108—10" 4-side moulder with 50 HP motor
Fay & Egan No. 209 ball bearing moulder
**SURFACERS**—Whitney No. 105—24" DMD with variable feed
30" No. 156 Fay & Egan ball bearing
No. 490 Fay & Egan 24" single
30" No. 340 Fay & Egan
30" No. 32D Smith ball bearing single
24" Whitney Double Cabinet Type.
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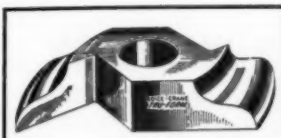

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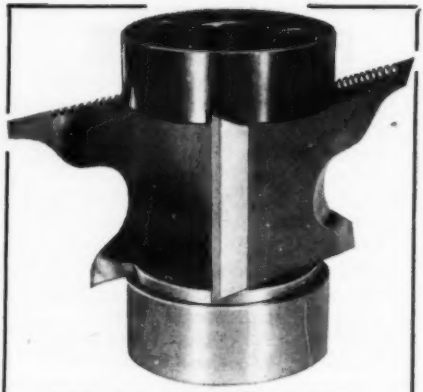

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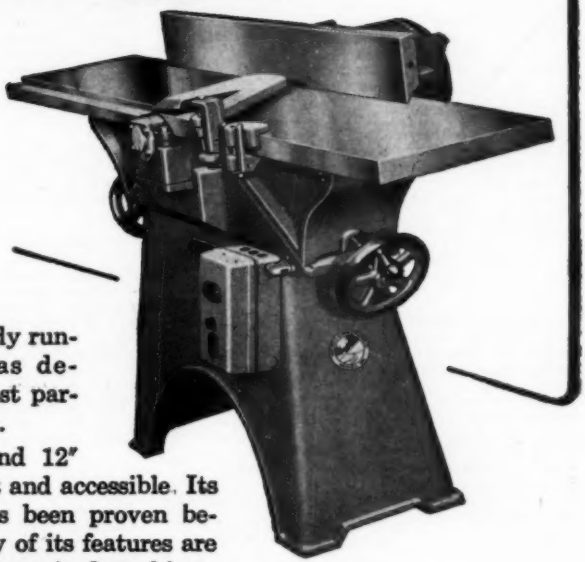

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- Wood Shapers
- Jointers
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- Mortisers (Chain & Hollow Chisel)
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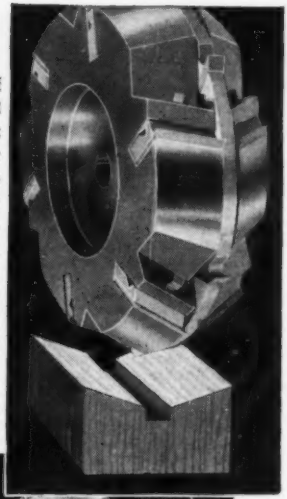
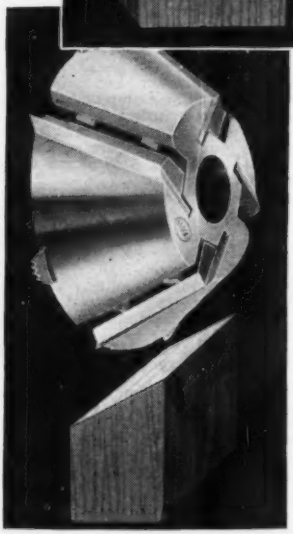
# Combine BADGER FORMED PATTERN ROUND HEADS

## *And Save Cutter Costs!*



When the form of the cut to be made consists of a combination of angular and straight cuts, it often is most economical to use BADGER Formed Pattern Round Heads. Not only economical on first cost but less expensive for replacement knives. By using a separate head for each part of the cut, various combinations can be arranged to handle other jobs—You thus get the advantages of special tooling together with flexibility. In the example shown, for instance, three separate heads were combined to make the cut. When it was desired to widen and deepen the groove, all that had to be done was to add spacers between the heads and increase the size of the knives in the central BADGER Groover Disc.

If it were later desired to make only a single angular cut, either right or left hand, the right or left head singly would produce the cut as shown by the single head. It is thus well to consider that when the component parts of a cut are simple angles, you will obtain more flexibility and save cutter costs with a combination of BADGER Formed Pattern Round Heads!



By forming the head to the general shape of the cut, knife protrusion is held to a minimum with maximum support being given the cutting blades. BADGER Thin High Speed Steel or Solid Carbide Knives are used. All regular round head construction features are available: many or few knives can be put in the heads; straight or shear cutting knives; carbide plug cutters added to handle glue lines or plastics; heads can mount either smooth or corrugated back knives; any type of mounting desired such as self-centering sleeve, plain bore with or without set-screw, with or without hub or counterbore, etc. If you have a cutting application, send a sketch or a sample cutting on to WISCONSIN today! Badger engineers gladly make recommendations that will increase your production with the least long-range cutterhead expense!

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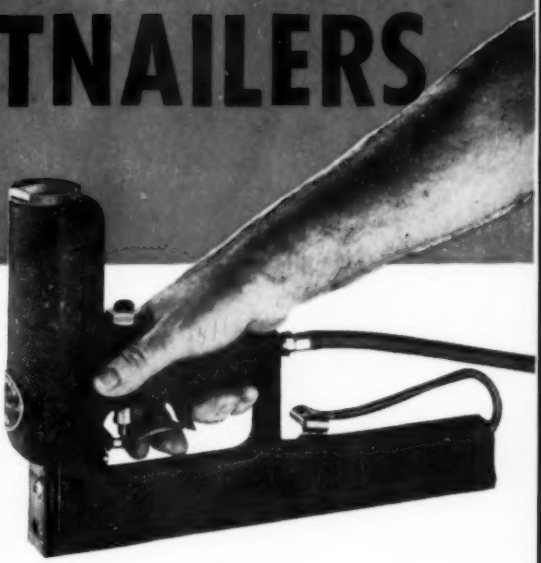

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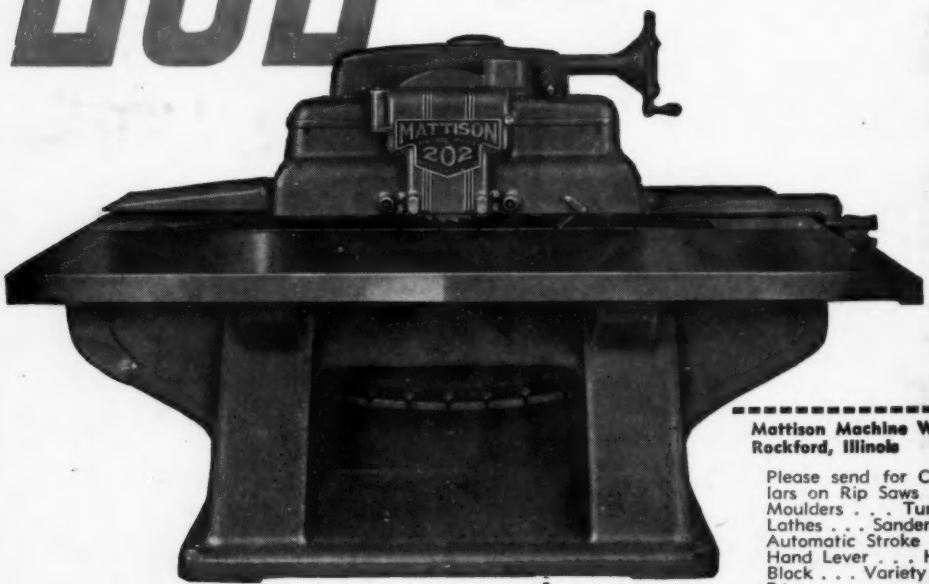


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